THE PLANT DISEASE REPORTER

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BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING
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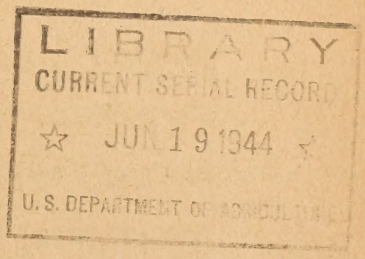

SUPPLEMENT 147

PLANT DISEASE SURVEYS

IN THE NORTHEASTERN UNITED STATES IN 1943

June 1, 1944

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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F O R E W O R D

The following summaries report the result of surveys conducted by members of the Emergency Plant Disease Prevention Project of the Bureau of Plant Industry, Soils, and Agricultural Engineering. Since the inclusion of all the summaries in one supplement would result in a volume too bulky for easy handling, the material has been divided on a roughly geographical basis, as follows:

Supplement 147 -- Northeastern United States, including the area north of the Ohio and Potomac Rivers, west to Minnesota and Iowa.

Supplement 148 -- Southeastern United States, south of the Ohio and Potomac, west to Missouri, Arkansas, and Louisiana.

Supplement 149 -- Western United States from the Great Plains States westward.

The considerable variation in the conditions under which the surveys were conducted in the different States has resulted in a corresponding variation in content and form of the summaries, and no attempt has been made to have them conform to a uniform method of presentation. Some of them report only data obtained during the surveys; while in others information from additional sources has been incorporated into a more complete account of disease occurrence in the State during the season.

In all cases the surveys were planned under the supervision of the collaborators and other pathologists in the States concerned, and made with assistance from them as well as from county agents and numerous other persons, whose aid is acknowledged and appreciated.

PLANT DISEASES IN NEW ENGLAND, 1943

Robert C. Cassell

References are made throughout the New England report to drought areas and areas of excessive rainfall. The following table, showing the monthly precipitation and departures from the normal, by States, will help to explain some of the unusual situations.

Total Monthly Precipitation and Departures from Normal during the Period April to September, 1943, in the New England States. (Information from U. S. Weather Bureau, Boston)

Month		Precipitation (inches) in Vermont	New Hampshire	Maine	Massachusetts	Connecticut	Rhode Island
April							
Total		3.45	3.50	2.73	3.49	3.40	3.38
Departure:	+	0.58	0.45				
	-			0.36	0.05	0.26	0.24
May							
Total		5.75	4.51	3.99	5.56	5.15	3.04
Departure:	+	2.54	1.36	0.83	2.24	1.48	
	-						0.28
June							
Total		4.24	4.72	4.49	2.31	3.31	1.49
Departure:	+	0.60	1.13	1.00			
	-				1.17	0.21	1.58
July							
Total		4.39	4.72	3.90	4.80	3.46	2.79
Departure:	+	0.61	1.00	0.53	1.24		
	-					0.51	0.28
August							
Total		5.30	5.21	4.61	2.48	1.62	2.12
Departure:	+	1.75	1.66	1.30			
	-				1.19	2.51	1.55
September*							
Total		2.08	1.99	2.55	1.49	1.50	1.32
Departure:	+						
	-	1.65	1.74	1.08	2.27	2.45	2.11
Total for period		25.21	24.65	22.27	20.13	18.44	14.14
Departure:	+	4.43	3.86	2.22			
	-				1.20	4.46	6.22

* Not final, subject to possible slight correction

The actual drought area of New England in 1943 included Connecticut, Rhode Island, and southern and eastern Massachusetts, and extended as far north as Portland, Maine, constituting a coastal belt line terminating at the north in lower Maine. Yields of all mid-summer and fall crops were appreciably lowered unless irrigation was employed. Apple and potato yields were strikingly affected. In Connecticut and Rhode Island apple yields were reduced probably 25%, principally through reduction in size of fruits, and potato yields were lowered 30 to 50%. In Massachusetts, even in the Connecticut Valley and the Berkshire Hills to the west, potato yields were 10 to 40% below normal. These lowered potato yields include reductions due to all contributing factors, among which aphids, leafhoppers, and flea beetles played no small part this year. In Maine, on the other hand, the 71,040,000 bushel potato crop was figured at an average yield of 370 bushels per acre, which is considered a very good yield.

DISEASES OF VEGETABLE CROPS

ALLIUM CEPA, ONION

Colletotrichum circinans, smudge. A single light case was found in some recently stored onions in Waltham, Massachusetts. Damage was slight.

Fusarium sp., root rot. From a July observation of O. C. Boyd and Thomas Sproston, Jr., it is noted that root rot was more prevalent than usual in Massachusetts, especially in set onions. Where observed, from 5 to 35% of the plants were affected, with premature lodging and death of tops accompanied by some bulb decay. Moderate to heavy losses were expected in storage.

Peronospora destructor, downy mildew, was severe in Presque Isle, Maine, according to Reiner Bonde.

Phoma terrestris, pink root, was reported once in Connecticut.

Urocystis cepulae, smut. Early in the season smut was more pronounced than for several years in the Connecticut River Valley of Massachusetts. A 30% reduction in yield was found in 1 field of seeded white pickle onions.

APIUM GRAVEOLENS, CELERY

Cercospora apii, early blight, was generally prevalent in Connecticut, Rhode Island, and Massachusetts, but damage was apparently less than in most seasons. Only a few isolated severe cases were noted and these were due either to infrequent copper applications or to the use of overhead irrigation.

Septoria apii, late blight, was found in Connecticut, Rhode Island, Massachusetts, and New Hampshire, but was much less prevalent generally than early blight. A few isolated cases of 4 to 6% damage occurred, but in general no appreciable damage was noted where adequate protection was furnished.

Black heart (physiogenic). Two severe cases were noted in Massachusetts; one case was an almost total loss of a 7-acre field. A case of slight proportions was found in Connecticut.

ASPARAGUS OFFICINALIS, ASPARAGUS

Puccinia asparagi, rust. In spite of the serious outbreak of rust in Massachusetts in 1942, the disease did not appear this year until September 17, about 2 months late. One severe case was observed on Mary Washington late in September. Losses were negligible in Massachusetts in 1943, and no rust was found in the other New England States.

BETA VULGARIS, BEET

Actinomyces scabies, scab. One moderate case was reported in Connecticut.

Cercospora beticola, leaf spot. Light infections were recorded in scattered areas in Connecticut, Rhode Island, and Massachusetts.

Phoma betae, root rot. One light case was reported in Connecticut.

BETA VULGARIS var. CICLA, SWISS CHARD

Cercospora beticola, leaf spot. A 100% infection was observed in 1 home garden in Bristol County, Massachusetts, with moderate damage.

BRASSICA CAMPESTRIS, RUTABAGA

Cercosporella albo-maculans, white leaf spot, was generally spread over one field in Massachusetts. Damage was severe in spotted areas of the field.

Xanthomonas campestris, black rot, was general in one field in Massachusetts, with very slight damage.

BRASSICA OLERACEA var. BOTRYTIS, CAULIFLOWER

Alternaria circinans (A. brassicae), black leaf spot, was recorded in Connecticut and Massachusetts, but prevalence was far less than in most past years. Slight to moderate damage was recorded in 3 Massachusetts fields.

Plasmodiophora brassicae, club root, was found in 1 field in Massachusetts and 1 field in Maine. Except for an occasional severely stunted plant, loss was slight.

Pseudomonas maculicola, peppery leaf spot. A light localized infection was observed in 1 field in Massachusetts. The disease was far less prevalent than usual.

BRASSICA OLERACEA var. BOTRYTIS, BROCCOLI

Alternaria circinans (A. brassicae), black leaf spot, was recorded in Connecticut, Massachusetts, and Vermont. It was usually confined to the lower leaves and in no case was any appreciable damage involved.

Peronospora parasitica, downy mildew, was recorded once, in Massachusetts, with no damage.

BRASSICA OLERACEA var. CAPITATA, CABBAGE

Alternaria circinans (A. brassicae), black leaf spot, was recorded in Rhode Island, Massachusetts, and New Hampshire, but never in serious proportions. It was usually confined to the older leaves with practically no damage involved.

Fusarium oxysporum f. conglutinans, yellows, was reported from 3 counties in Massachusetts and 1 in Connecticut. A 25% loss was estimated for one Massachusetts field, and 20% for another. Growers are rapidly turning to resistant varieties. In Massachusetts, yellows was reported from Bristol County this year for the first time.

Peronospora parasitica, downy mildew, was rather prevalent on the early and second-early crops in Massachusetts, but was less prevalent on late cabbage than usual. Infection was usually confined to the lower leaves and no severe damage was recorded.

Phoma lingam, black leg, was observed in various places in Massachusetts. Severity ranged from traces to very light infections. The disease was less extensive and damaging this year than usual.

Plasmodiophora brassicae, club root, occurred in rather serious proportions in certain areas of Massachusetts and Maine this year. Home gardens as well as commercial fields were affected. The most serious case observed was 25% loss in 1 field in Maine.

Xanthomonas campestris, black rot, was found in Connecticut, Rhode Island, and Massachusetts. The disease accounted for a 5 to 10% loss in 1 field in Rhode Island and a 90% loss in 1 in Massachusetts. In general black rot was scarcer in New England this year than in most past seasons.

BRASSICA PEKINENSIS, CHINESE CABBAGE

Alternaria circinans (A. brassicae), black leaf spot. A single record was made in New Hampshire, of no damage.

CAPSICUM FRUTESCENS, PEPPER

Xanthomonas vesicatoria, bacterial spot. A single case of leaf spotting but no fruit infection was observed in eastern Massachusetts. Damage was not appreciable.

Mosaic (virus) was found in Connecticut, Rhode Island, and Massachusetts, and appeared as the most serious disease of peppers in New England. Most fields had from a trace to 10% infection with an occasional field, especially in Connecticut, showing up to 50 or 60%.

Blossom-end rot (physiogenic) was quite common throughout Connecticut. The damage ranged from slight to moderate depending upon the location.

Sun scald (non-parasitic) appeared in severe proportions, especially in victory gardens of the New Haven-Hamden area of Connecticut.

CITRULLUS VULGARIS, WATERMELON

Colletotrichum lagenarium, anthracnose, was recorded from a single planting in Rhode Island. Here some of the fruits were badly marked, probably reducing the sale value of a quarter of the crop.

CUCUMIS MELO, CANTALOUP

Alternaria cucumerina (Macrosporium cucumerinum), leaf blight, occurred in approximately the same proportions as scab and anthracnose.

Cladosporium cucumerinum, scab, occurred as light infections in several counties of Massachusetts, without appreciable losses, decidedly lower this year than usual.

Colletotrichum lagenarium, anthracnose. Occurrence was approximately the same as for scab.

Erwinia tracheiphila, bacterial wilt. Light infections were noted in several Massachusetts counties. Losses were very light.

Fusarium sp. and Verticillium sp., root rot, wilt, caused heavy losses on 2 Massachusetts farms. In both fields most of the plants of all varieties were wilting and dying prematurely from root dieback and cankers.

Pseudoperonospora cubensis, downy mildew, was found in Connecticut, Rhode Island, and New Hampshire. In Rhode Island it was widespread and accounted for considerable damage, even to total loss. It was found in small amounts in a single field in Connecticut and New Hampshire.

Septoria sp. (probably cucurbitacearum), leaf spot, occurred as local light infections in 2 Massachusetts counties.

Mosaic (virus). One observation, of 50% infection, was made in Massachusetts.

CUCUMIS SATIVUS, CUCUMBER

Cladosporium cucumerinum, scab, was found in Massachusetts and Maine. It became widespread and damaging in Massachusetts about August 15. Scab ran its usual course in the upper Connecticut River Valley but was much less severe in the drier sections of the southern and eastern parts of the State. Scab was found in 2 places in Maine, but only around La Grange was the damage severe enough to reduce the market value appreciably.

Colletotrichum lagenarium, anthracnose, was found in Massachusetts and Vermont. About 50% of the fields observed in Massachusetts had foliage infection this year, with actual losses light. Anthracnose caused some loss in victory gardens in Burlington, Vermont.

Erwinia tracheiphila, bacterial wilt. Boyd and Sproston report that bacterial wilt was first observed in Massachusetts June 26; later it could be found in practically every field and garden visited. Losses ranged from about 5% to 50% of the plants, in spite of the fact that the disease was generally less damaging than in most past seasons.

Erysiphe cichoracearum, powdery mildew, was found in one location in New Hampshire. Prevalence was general in this field, but damage was very slight, if any.

Pseudomonas lachrymans, angular leaf spot. Following bacterial wilt and scab, angular leaf spot was the next most widely distributed disease of cucumbers in Massachusetts. Prevalence was general but infection was mostly light except under irrigation in the eastern part of the State, where the disease was most severe. Angular leaf spot was quite general in the Portland-Scarboro area of Maine, and caused some appreciable losses in the Portland region.

Pseudoperonospora cubensis, downy mildew, appeared in Massachusetts the second week of September and later was found in most sections of the State. Some heavy losses were suffered in the eastern part, especially in Bristol and Plymouth counties where there were 2 known cases of 75 to 80% losses. F. L. Howard also reports downy mildew in Rhode Island.

Mosaic (virus) appeared somewhat later than usual this season but spread rapidly after the delayed start. It was found in Connecticut, Rhode Island, Massachusetts, Vermont, and Maine. There was a probable loss of 20 to 25% of the Connecticut River pickle crop, with less damage to the

slicing cucumbers. There was also probably 5 to 10% loss to the cucumber crop in eastern Massachusetts, the Burlington area of Vermont, and the La Grange area of Maine.

Sun scald (non-parasitic). Early leaves were badly damaged by sun scald, followed by later recovery of the plants in the Mansfield, Connecticut area.

CUCURBITA MAXIMA, SQUASH, and CUCURBITA PEPO var. CONDENSA, SUMMER SQUASH

Alternaria sp., fruit rot, was found in several locations late in the season in New Hampshire, and in Burlington, Vermont. Losses were negligible, if any, as only immature fruits appeared susceptible.

Alternaria cucumerina (Macrosporium cucumerinum), leaf blight, caused no damage as it appeared on immature fruits late in the season in east-central Massachusetts.

Choanephora cucurbitarum, brown rot, blossom blight, was found in Connecticut, Rhode Island, Massachusetts, and New Hampshire. It was very severe in Rhode Island, where a loss in set of 2/3 of the summer squash and 1/2 of the winter squash was reported. In Massachusetts losses were heaviest in the eastern part, where they were recorded as slight to moderate. Moderate losses occurred in the Hamden, Connecticut area, while in New Hampshire brown rot was well distributed but the loss light.

Cladosporium cucumerinum, scab, was observed only in Massachusetts, where its occurrence on summer squash was much less common than usual. It appeared to be most prevalent in the western part. On winter squash in storage scab seemed confined to the seconds or immature small squashes.

Colletotrichum lagenarium, anthracnose, was found only in New Hampshire, but was generally prevalent there in the Litchfield-Pittsfield-Barnstead area. Damage to the fruit ranged from slight to moderate.

Erwinia tracheiphila, bacterial wilt, was found in Massachusetts, Rhode Island, and Maine. It was generally common but less extensive and damaging to summer squash than usual; more damage, although light, was caused to fall and winter varieties in Massachusetts. Only one case was found in Maine, at Scarboro, with very slight damage.

Erysiphe cichoracearum, powdery mildew, was found generally prevalent in Connecticut, Rhode Island, Massachusetts, Vermont, and New Hampshire. It was much more severe in southern New England than in the northern part. In the southern section, greatest damage was caused to foliage early in the season, while new leaves produced under drought conditions later were almost free from mildew. Many older leaves of the plants were killed by the disease, and severe stem infections were common.

Fusarium solani var. cucurbitae, foot rot, was generally distributed in Connecticut, damage appearing moderate to severe.

Mycosphaerella citrullina, leaf spot, was observed on the aging foliage of winter squash in east-central Massachusetts late in the season.

Pseudomonas lachrymans, angular leaf spot. A single case with very light infection was found in Portland, Maine.

Pseudoperonospora cubensis, downy mildew, was found on summer and winter squash in Bristol County and on summer squash only in Middlesex and Plymouth Counties, Massachusetts. Infections were mostly light to moderate but in some fields of summer squash there were areas of marked de-

foliation. Boyd reports this to be the first outbreak of downy mildew on squash in Massachusetts since 1932. Downy mildew was also found in Rhode Island.

Rhizopus sp., black mold rot, was found in 2 fields in southern New Hampshire. Damage was negligible as the rot appeared late in the season on immature fruits.

Septoria cucurbitacearum, leaf spot, was observed in Franklin, Hampshire, and Middlesex Counties, Massachusetts. In Franklin County heavy foliage spotting caused moderate damage to the crop in 1 field.

Mosaic (virus) was present throughout most of Massachusetts and the Connecticut River Valley of Connecticut. In Middleton, Connecticut, damage was most severe; many fruits were not marketable. Mosaic was less severe in Massachusetts than in most past seasons.

Yellows (aster yellows virus). One case was observed in Maine, with practically no damage.

Sun scald (non-parasitic). In the Mansfield, Connecticut area the early leaves were badly damaged by sun scald.

CUCURBITA PEPO, PUMPKIN

Erysiphe cichoracearum, powdery mildew. A single case was noted in Kingston, Rhode Island, where the disease was general in the field and considerable damage followed severe defoliation.

Pseudoperonospora cubensis, downy mildew. A single case of light to moderate infection with no appreciable damage was observed in Bristol County, Massachusetts.

DAUCUS CAROTA, CARROT

Cercospora carotae (C. apii var. carotae), leaf spot, and/or Alternaria carotae (Macrosporium carotae), leaf blight, were observed in Connecticut, Rhode Island, Massachusetts, and Vermont. These 2 leaf diseases appeared late but became fairly widespread and caused some loss in local areas. One large field in Southington, Connecticut, suffered a loss of about 1/3 of the total leaf area. Some noticeable loss occurred in Apponaug, Rhode Island. Most severe losses probably occurred in Hampshire and Franklin Counties, Massachusetts, where yield reduction amounted to 15 to 20%, mostly from Cercospora. In the Burlington-Essex Junction area of Vermont losses were light and confined to victory gardens.

Yellows (aster yellows virus) was observed in all the New England States. Infection was scattered with no serious losses anywhere. Losses probably reached 5% in a few fields.

Root branching (non-parasitic). A single case of 100% loss was observed in a 5-acre field in Southington, Connecticut. Dry weather and a hard-pan soil appeared to be causing the roots to develop from 2 to 4 branches.

LACTUCA SATIVA, LETTUCE

Septoria lactucae, leaf spot, was found in Massachusetts, Vermont, and Maine, causing only slight damage to the leaves in most cases. Moderate to severe damage was noted in 1 irrigated Massachusetts field.

Yellows (aster yellows virus) was the principal disease observed in

August in all sections of Massachusetts. It was most prevalent in the drier eastern counties where infection ranging from 10 to 70% and losses from a trace to 50% were observed. The disease was also the source of considerable concern in the Portland-Scarboro area of Maine, where most growers suffered from 25 to 35% loss.

LYCOPERSICON ESCULENTUM, TOMATO

Alternaria solani, early blight, was found generally distributed throughout New England. No appreciable losses were observed in Vermont or Maine, and only 1 case was found in New Hampshire where defoliation was severe enough to reduce the yield. A few scattered cases of serious defoliation were found in Rhode Island, and 1 case in Connecticut where damage was slight to moderate. In Massachusetts a field of Bonny Best in Worcester County suffered 25 to 35% defoliation. A planting of the same variety in Hampden County was reduced 30 to 35%. In 1 large field of trellised Comet in Plymouth County, the disease caused failure of the first 2 or 3 hands, severe defoliation, and a 25% reduction in yield. Except for these cases cited in Massachusetts, early blight was less damaging late in the season than in most former years.

Cladosporium fulvum, leaf mold, was found in field plantings in Connecticut, Rhode Island, Massachusetts, and Maine. In Connecticut damage to the foliage ranged from slight to moderate in Hamden and New Haven. J. G. Horsfall reported that leaf mold was the general complaint of victory gardeners in New Haven. The disease apparently caused no noticeable losses to field tomatoes in Rhode Island, Massachusetts, or Maine, although some losses were known to occur in greenhouses in Rhode Island and Massachusetts.

Colletotrichum phomoides, anthracnose, was observed in Connecticut, Rhode Island, and Massachusetts. Most severe infections occurred in Rhode Island where the disease was recorded in Kingston, Apponaug, and Newport. In Newport fruit infection prevented harvesting of practically all of the later fruits. Occurrence was least extensive in Massachusetts.

Corynebacterium michiganense (Phytomonas michiganensis), bacterial canker, was common in the Waltham section of Middlesex County, Massachusetts. One grower there lost his entire crop of Victor and up to 70% of other early-planted varieties.

Fusarium oxysporum f. lycopersici (F. bulbigenum var. lycopersici), Fusarium wilt. One case with moderate damage was noted in southern Essex County, Massachusetts.

Phytophthora infestans, late blight, was observed in Massachusetts, Vermont, New Hampshire, and Maine. In Scarboro, Maine, it was found spreading from potatoes to tomatoes on August 22, when infection spots were evident on the tomato fruits. Subsequently, tomatoes throughout Maine became infected and considerable loss of fruit resulted. Some fruit infection was found in southern New Hampshire about the middle of September. Considerable loss of fruit occurred as far north as Burlington, in Vermont. In Massachusetts a limited amount of fruit loss occurred in a few scattered areas.

Septoria lycopersici, leaf spot, was found in Connecticut, Rhode Island, Massachusetts, and Vermont, in widely scattered areas and in varying amounts. Infection ranged from very light to moderately severe.

Verticillium sp., verticillium wilt, was observed in 1 field in eastern Plymouth County, Massachusetts, where it was causing slight to moderate damage.

Blossom-end rot (physiogenic), accompanied by physiogenic fruit-cracking and sun scald, accounted for the greatest loss to tomatoes in Connecticut, Rhode Island, and eastern Massachusetts, the drought area of New England. In eastern Massachusetts Boyd estimated from 5 to 10% loss due to blossom-end rot; in Rhode Island Howard estimated 5% loss; and in Connecticut the loss was at least 5 to 10%.

Mosaic (tobacco mosaic virus) was found in Connecticut, Massachusetts, and New Hampshire. Occurrence was rather scattered in Connecticut and Massachusetts, but was always most serious on trellised tomatoes. One severe infection was found in greenhouse tomatoes in Massachusetts. Only 1 observation was made in New Hampshire. No appreciable losses were recorded for mosaic in New England.

Streak (virus). One light case was observed in a Massachusetts greenhouse.

PASTINACA SATIVA, PARSNIP

Cercospora pastinacae (C. apii var. pastinacae), leaf spot, was found rather rarely in Rhode Island, Massachusetts, and Vermont. Only in 1 field in Rhode Island and in 1 in Massachusetts was the foliage infection recorded as moderately heavy.

Ramularia pastinacae, leaf blight, was recorded in Massachusetts as less abundant than Cercospora.

PHASEOLUS spp., GARDEN BEANS

Botrytis cinerea, gray mold rot. Isolated cases were found in Massachusetts and Maine, particularly where vine growth was heavy. It caused very little loss, if any.

Colletotrichum lindemuthianum, anthracnose, was found in Connecticut, Massachusetts, Vermont, New Hampshire, and Maine. In Massachusetts it was far less prevalent than usual, especially in the drought area of the eastern part of the State, the only severe case recorded being 1 field with a 90% loss. No appreciable losses were recorded in Connecticut, Vermont, New Hampshire, or Maine.

Fusarium solani f. phaseoli (F. martii var. phaseoli), dry root rot, (Also Fusarium spp. and Rhizoctonia spp., root rots). In Massachusetts, according to Boyd and Sproston, most plantings early in the season showed above-normal amounts of root rots. A 50% loss in 1 field this year was the heaviest loss ever recorded from F. solani phaseoli in the State.

Isariopsis griseola, angular leaf spot, was observed once, as a trace in a Massachusetts field.

Pseudomonas medicaginis var. phaseolicola, halo blight, was found in Massachusetts, Rhode Island, New Hampshire, and Maine. In Massachusetts the disease occurred in all counties but in much lighter amounts than usual. In Maine the disease seemed more virulent, the systemic phase being quite pronounced, and it probably caused some reduction in yield.

Uromyces phaseoli var. typica (U. appendiculatus), rust, was observed

in Massachusetts and Vermont. Two severe cases occurred in Massachusetts; both on Kentucky Wonder, 50% defoliation being noted in 1 field and 80% loss in the other. Slight infection was noted on a bush variety. In Vermont some losses up to 30% were observed.

Xanthomonas phaseoli, common bacterial blight, appeared in Massachusetts later than usual. Only one heavy field infection was found and that was after harvest. In Rhode Island a single case was noted, with very slight damage if any.

Mosaic (virus) was found in Connecticut, Rhode Island, Massachusetts, Vermont, and Maine, apparently causing less damage this year than in some other seasons. The heaviest infections observed were only slight and damage was negligible.

PISUM SATIVUM, PEA

Erysiphe polygoni, powdery mildew, occurred extensively with slight to moderate damage in Aroostook County, Maine.

Fusarium sp., root rot, was common in Connecticut wherever late peas were planted.

RHEUM RHAPONTICUM, RHUBARB

Phyllosticta straminella, leaf spot, was found in Connecticut, causing very slight damage in 2 locations.

SOJA MAX, SOYBEAN. See with forage crop section

SOLANUM MELONGENA, EGGPLANT

Alternaria solani, leaf spot, was reported by Boyd and Sproston to be generally present but causing very slight damage in Massachusetts.

Phomopsis vexans, leaf spot, fruit rot, occurred in local outbreaks in Connecticut and Rhode Island, causing slight damage as infection was confined mostly to the foliage. Damage this year was less than usual.

Verticillium albo-atrum, wilt, was generally distributed in Connecticut, Rhode Island, and Massachusetts. Losses were slight to moderate in Connecticut and Rhode Island. Severe infections with losses of 50 to 75% were observed in 2 counties in Massachusetts. This disease is considered the principal limiting factor to successful eggplant culture in Massachusetts and southern New England.

Mosaic (virus) was observed to be causing very slight damage in one Connecticut planting.

SOLANUM TUBEROSUM, POTATO

Actinomyces scabies, scab, was probably the most common and serious disease of potatoes in home gardens this year, and in some cases it was also more damaging than usual to the commercial crop. In many cases potatoes were grown in new locations this year, both in victory gardens and in fields, which fact contributed to losses from scab. In New England, scab was apparently of least consequence in Rhode Island. A few severe cases were found in Connecticut, the most serious one being an estimated 5% loss for 200 acres in East Windsor. In Massachusetts, light to moderate damage occurred in many fields in the valley area of Hampshire and Franklin Coun-

ties where the land in past years had been limed for onion or tobacco culture. In a 20-acre limed pasture in Essex County put into potatoes this year the tubers were 100% infected, with a 40 to 50% loss in crop value. In Vermont, scab seemed to be unusually bad with a higher than normal crop loss in places. Some cases of 80 and 90% tuber infection of the deep crater type were found, although, in general, commercial losses were not large. Scab did not appear to be as important in New Hampshire and Maine as in the other States. It was unusual not to find at least traces of scab in northeastern New England, but it is not believed that the disease will account for any appreciable crop loss there.

Chippewa and Green Mountain appear to be the varieties most susceptible to deep scab.

Alternaria solani, early blight. Except for Rhode Island, this disease occurred throughout New England in more widespread and damaging proportions in 1943 than in the average year. General, light to moderate attack was the rule in practically all fields with possible yield reductions up to 5 or 10% in places.

(Corticium solani) see Pellicularia filamentosa.

Corynebacterium sepedonicum, bacterial ring rot, appeared in New England in the most serious proportions ever experienced. Definite occurrence was found in all of the States except Connecticut and New Hampshire. Only one affected field was found in Rhode Island, a 10-acre field that showed about 0.5% rotted tubers at digging time. The owner reported the seed as certified Green Mountain. The disease was found in 3 counties in Massachusetts. One 150-acre planting showed a general but light infection of parts already dug, except one part in which at least 2% of infected tubers were left in the field. This field was planted with No. 2 seed supposedly from a certified crop. In Vermont, E. L. Bailey reported that bacterial ring rot was fairly well distributed over the State. During a limited survey previous to digging time, it was found in 3 fields, and indications were that 2 of the affected fields would contain at least 2 or 3% rotted tubers when dug. In Maine, the disease was rather generally distributed throughout potato-growing sections and created considerable concern among the growers. Of 33 fields in Aroostook County examined during digging, 53% contained ring rot. In about half of the affected fields severity ranged from a trace to 1% of rotted tubers. The greatest amount found in any one field was 10%.

Erwinia phytophthora (E. atroseptica), black leg, appeared to be of little consequence, generally speaking, in southern New England in 1943. In Vermont, according to Bailey, it was unusually widely distributed. In central Maine Bacon stated that 3 fields of the 35-acre class were refused certification because of black leg. Yield reductions in this area ranged from a trace to 12%. In Aroostook County early field inspection indicated that black leg was generally present. Counts ranged from a trace to 20% infected plants in certain fields. At digging time rotted tubers ranged from a trace to 0.5 or 1% in an occasional field.

Fusarium solani var. eumartii, wilt, was found in 2 fields in Massachusetts, one showing 10 to 15% general infection, the other a general but light infection.

Pellicularia filamentosa (Corticium solani), rhizoctonia. According to Boyd and Sproston, greatest damage from rhizoctonia in Massachusetts

took place early in the season. Injury was evidenced in missing and weak hills and light tuber sets due to severing of the stolons. As "rhizoc" was found generally present in light amounts on the tubers in all New England States, it is likely that early-season damage also was general. It was not possible to estimate actual losses, although 5% tuber infection was estimated in Rhode Island.

Phytophthora erythroseptica, pink rot. A single case was observed in Massachusetts in 1943, of a trace of tuber decay, where moderate to severe losses had occurred in recent years.

Phytophthora infestans, late blight, occurred in 1943 only in central and northern New England. None was found in or reported from Connecticut or Rhode Island, probably because of the general drought conditions and warm weather in those States.

In Massachusetts, late blight was first found in the Connecticut Valley on July 27, and it was not until September 1 that it was distributed over the entire State, including the drier regions in the eastern part. Very little damage was caused to either tops or tubers where vines were properly sprayed. In general, owing to infrequent and light rains, tuber decay was negligible except in occasional gardens or low wet fields.

In Vermont, where rain was general throughout the summer, the disease was more severe over the whole State than it has been for years. Preharvest samplings indicated that many fields would contain from 2 to 3% of late blight rot at digging time. In 2 or 3 fields particularly severely attacked, limited samplings indicated 25% of late blight rot by digging time. Northwestern Vermont (Franklin County) was apparently the worst affected by late blight of any area in New England. A few fields were not dug because of combined tuber rots (late blight, bacterial ring rot, black leg), and practically all fields dug were reduced in yield from 35 to 75% by late blight, with an average reduction of about 50%.

In southern New Hampshire late blight generally caused slight to moderate damage to the foliage, but dry weather in early September checked its development and no serious losses were anticipated.

In Maine, the disease appeared late but increased rapidly toward the end of the season prior to digging. Late in the season it was more severe in central Maine than usual and moderately severe in Aroostook County. At digging time a field survey in Aroostook County found 2/3 of the fields to contain blight-affected tubers. Most fields showed from a trace to 2 or 3%, and the most noted was 12%. In a later inspection late blight rot was noted in 60% of the 45 storage houses inspected in Aroostook County; of the affected lots 45% had from a trace to 5% blight rot, 1 lot was 25% affected, another 80%, and another 95%. One grower estimated $80,000 loss resulting from early digging while the vines were still green and freshly infected. A commercial dealer in central Maine estimated his probable loss (including certified and table stock Green Mountain) at 15,000 to 25,000 bushels or 35 to 40% of his total storage. The loss in this case was from late blight followed by bacterial soft rot.

Spongospora subterranea, powdery scab, was found in trace amounts at Presque Isle and Van Buren, Maine.

Leafroll (virus) seemed to occur in about normal proportions in New England in 1943. Following are counts made in Massachusetts, Maine, and

Rhode Island. In Massachusetts, Cobbler, Sebago, and Green Mountain showed from 5 to 15%, Chippewa from 10 to 40%, averaging 25%, Katahdin from a trace to 10%. One grower reported that his Katahdins from No. 2 seed showed from 25 to 80% leaf roll. In Maine, the following counts were made in the most severely affected fields: Ft. Fairfield 30%, Caribou 30%, Amity 54%, Dexter 6% in Green Mountain and 25% in Chippewa. In Rhode Island, counts of 7 fields in the Tiverton-Little Compton area showed infection ranging from 20 to 40%.

Mosaics (virus). Even mild mosaic was so masked in Massachusetts that it was hard to detect. However, an occasional light infection was recorded. In Maine, the only other New England State where mosaic was found, 3 cases were seen; 2 of mild mosaic with 30% infection in 1 field, and the other a light case of rugose mosaic.

Net necrosis (leafroll virus). A single case was observed at Houlton, Maine, where a large field of Green Mountain showed 35% infection.

Purple top (aster-yellows virus). Except for an isolated case in New Hampshire, and several fields of Sebago severely attacked in Rhode Island, purple top seems to have centered very largely in Massachusetts, where it was far more prevalent in 1943 than in most past seasons. It was most pronounced in the Connecticut River Valley, but was also present in most fields visited in other sections after August 1. Plant infections usually ranged from a trace to at least 25%, although one field with nearly 100% was found in Pittsfield. Katahdin generally appeared to be affected more strikingly than other varieties. Yield reductions were very slight even in the late varieties.

Spindle tuber (virus) was not noticeable in the growing fields from certified seed, but was very evident in many fields during harvest. One typical case was found in Massachusetts, in which the yield from home-grown seed was 150 bushels per acre less than in an adjoining field planted with certified seed.

Frost damage. Early in October when the Maine potato growers still had between 50,000 and 75,000 acres to dig, a heavy freeze injured some of the potatoes. In a survey of 28 fields in Aroostook County 90% of the fields showed frost damage, ranging in severity from a trace to 45%, with an average of about 2 or 3%.

Growth cracks (physiogenic). About 30% of the Maine fields showed from a trace to a slight amount.

Hollow heart (physiogenic). About 35% of the Maine fields produced an extraordinarily large proportion of big potatoes ("bulls"; one specimen in Caribou weighed 4 lbs. 9 oz.). Not all large potatoes are hollow, but so many are that such overgrown potatoes are discarded on size under suspicion of being hollow. Bulls were present in many lots from the hill areas of western Massachusetts, and from Vermont and New Hampshire. In Barnstead, New Hampshire, a 6-acre field of Sequoia produced 99% hollow potatoes, and across the road a 4-acre Katahdin field showed at least 70% hollow heart.

Leak (physiogenic). A 5-acre field in Kingston, Rhode Island, showed about 1% of leaky potatoes at harvest time. (This is "sprain" according to Howard).

Stem necrosis (physiogenic) was apparently almost statewide in Connecticut, especially where new ground was used.

Sunburn (physiogenic). Every field visited in Aroostook County, Maine, was affected with sunburn to some extent, some very slightly. In the storage houses sunburn was present in 78% of the 45 lots inspected, severity ranging from a trace to 75%. About 30% was observed in most Katahdins and Sebagos; in other varieties, for the most part, from a trace to 15%. The loss due to sunburn is almost in proportion to the amount present as very little is allowed to pass in grading. 1943 is the worst year for sunburn on record in Aroostook County, owing very largely to the wet season and to shortage of labor for cultivation resulting in incompletely made ridges and exposure of the tubers.

Stem-end browning (cause unknown). In Aroostook County, Maine, 50% of the fields were affected, usually only in trace amounts, but 1 field of Katahdin showed 2%, 1 of Green Mountain 5%, and a second field of Green Mountain 50%.

Tipburn (cause questionable) was noticeable through New England but was definitely most severe in the southern part, especially in Connecticut and Rhode Island.

SPINACIA OLERACEA, SPINACH

Peronospora effusa, downy mildew. Severe infection was observed in 1 large Connecticut field, resulting in 5 to 10% loss. It was also found in 1 field in Massachusetts, causing a very slight loss. Downy mildew was less damaging to fall spinach than usual.

DISEASES OF CEREALS, GRASSES, AND FORAGE CROPS

AGROSTIS CANINA, VELVET BENT GRASS

Corticium fuciforme, pink patch. A single observation was made, at the Kingston, Rhode Island experimental plots where it was causing only a moderate amount of damage.

Sclerotinia homoeocarpa, dollar spot, was seen but once, at the Kingston, Rhode Island experimental plots. It was causing a moderate amount of damage.

AVENA SATIVA, OATS

Puccinia coronata, crown rust, was observed in several locations in Vermont and Maine. In many cases damage was severe, as evidenced by the shriveling of the grain.

Puccinia graminis var. avenae, stem rust, was observed as local outbreaks in Vermont and Maine. The presence of the common barberry (Berberis vulgaris) was reported near one severely damaged field in Brookfield, Vermont.

Ustilago avenae, loose smut, was found in 2 locations in Maine. Damage was slight to moderate.

Ustilago kolleri (U. levis), covered smut. Local occurrences in Maine caused only a slight loss.

HORDEUM VULGARE, BARLEY

Puccinia graminis, stem rust, was found in Newport and Littleton, Maine, where it was generally prevalent but causing very slight to slight damage.

Ustilago jensenii (U. hordei), covered smut, was found in 1 field in Caribou, Maine, where it was present in very small amounts.

Ustilago nuda, loose smut, also occurred in small quantities in the field at Caribou.

MEDICAGO SATIVA, ALFALFA

Pseudopeziza medicaginis, leaf spot, was observed once, in Maine, causing very slight damage.

Yellowing due to boron deficiency (diagnosed at the Storrs Station, Connecticut), was rather prevalent throughout central Connecticut. Considerable yellowing and some stunting of the plants was evident.

SOJA MAX, SOYBEAN

Mosaic (virus), with crinkle to rugose symptoms, was present on 24 varieties of edible soybeans in the Kingston, Rhode Island test plots. Infection ranged from 20 to 90% and was accompanied by marked stunting of the plants in certain cases. There was some reduction in yield. Mosaic was present in 1 field planting of edible soybeans in Connecticut and in several home gardens in Massachusetts, causing some severe stunting and yield reduction. Mosaic was also found in field soybeans in Maine, causing very slight stunting.

TRIFOLIUM spp., CLOVER

Erysiphe polygoni, powdery mildew, was generally distributed over New England; causing an unknown amount of loss.

Pseudopeziza trifolii, leaf spot, was found on red clover in New Hampshire and Maine; it was severe enough to cause damage only at 1 location in New Hampshire.

Uromyces trifolii, rust, was found causing slight to moderate damage at several places in Connecticut, Rhode Island, and Maine.

TRITICUM AESTIVUM, WHEAT

Gibberella zeae (G. saubinetii), scab, was noted in 1 field in Aroostook County, Maine, where it was generally distributed but resulted in only very slight to slight damage.

Puccinia rubigo-vera tritici (P. triticina), leaf rust, was general and causing slight damage in 1 field in Aroostook County.

Septoria nodorum, glume blotch, was general and causing slight damage in 1 field in Aroostook County.

ZEA MAYS, CORN

Bacterium stewartii (Phytomonas stewartii), bacterial wilt, was reported in 1 Connecticut planting.

Helminthosporium turcicum, leaf blight. Boyd and Sproston report only traces to very light infections generally in Massachusetts in 1943, contrasted with the severe outbreak of the preceding year in that State.

Ustilago maydis (U. zeae), smut, was much more severe than usual in southern New England in 1943, but was almost nonexistent in northern New

England. In Connecticut, damage was slight to moderate. In Massachusetts, smut was particularly bad in the early and second plantings in all counties. Boyd and Sproston reported 1 field observed in Middlesex County on July 28 with 30% of the plants infected and 20% ear infection, which was the heaviest loss from smut ever reported in the State. In Rhode Island, smut was widespread on sweet corn, popcorn, and field corn. Howard estimates a 5% loss of sweet corn ears in the worst attack of the last 5 years.

DISEASES OF FRUIT CROPS

AMYGDALUS PERSICA, PEACH

Monilinia fructicola (Sclerotinia fructicola), brown rot, was found only in Rhode Island, in 1 orchard. The grower reported a considerable amount of brown rot since, because of the small crop, the trees were not well sprayed. This orchardist, at Portsmouth, produced the only crop of peaches known to the writer in New England in 1943. He harvested 500 bushels.

Xanthomonas pruni, bacterial spot, was found in Connecticut, Massachusetts, and New Hampshire. Where it occurred, infection was fairly heavy and slight to moderate damage to the foliage resulted.

Winter injury. The severe winter of 1942-43 killed the peach fruit buds in New England.

FRAGARIA, STRAWBERRY

Mycosphaerella fragariae, leaf spot, was recorded in Connecticut, Rhode Island, Massachusetts, and Maine. Only in Portsmouth, Rhode Island, was there sufficient defoliation to cause some probable damage.

Root rot (cause undetermined) caused slight damage in 1 field in Bristol County, Massachusetts, and the loss of half the crop in the first bearing year of a 7-acre field in Hamden, Connecticut.

MALUS SYLVESTRIS, APPLE

Erwinia amylovora, fireblight, was found in Massachusetts and Maine. Only in South Amherst was there as much as slight damage in Massachusetts. In Maine, considerable damage was evident in the Acton area.

Glomerella cingulata, bitter rot. Two cases were observed in Massachusetts. In 1 instance the disease caused the loss of 1 tree which was removed in the fall; in the other case rot caused 50% loss of Rhode Island Greening in the orchard.

Gymnosporangium clavipes, quince rust, was observed in Massachusetts and Maine. Damage to Red Delicious and Golden Delicious in Maine was slight to moderate. In Massachusetts, both quince and hawthorn (G. globosum) rusts were less damaging than usual.

Gymnosporangium juniperi-virginianae, apple rust, was found in all of the New England States. Foliage infection was severe in some places but very little fruit infection was noted even on Wealthy. The disease was reported to be less prevalent than usual in Rhode Island.

Helminthosporium papulosum, black pox, was observed in 1 orchard each in Bristol and Plymouth Counties, Massachusetts. Leaf spots were numerous, and fruit spots were beginning to show on Northern Spy by the second week in September.

Mycosphaerella pomi (Cylindrosporium pomi), fruit spot (Brooks spot), was reported by G. A. Gries to be present in Connecticut.

Neofabraea malicorticis, anthracnose, was observed once in Maine; no damage was noted.

Physalospora obtusa (P. malorum), black rot, frog-eye, was found in Connecticut, Rhode Island, Massachusetts, New Hampshire, and Maine. Infection of the leaves varied from light to heavy. Fruit infection was not uncommon even in some well-sprayed orchards. Branch cankers were common following fireblight in 1 Massachusetts location.

Venturia inaequalis, scab. 1943 was one of the most favorable seasons on record for the development of apple scab in New England. Commercial losses in well-sprayed orchards in Rhode Island and Connecticut ranged from a trace to 40%; on the whole, scab accounted for from 15 to 20% of the fruits failing to make the No. 1 grade as they otherwise would. In Massachusetts, commercial losses in McIntosh ranged from a trace to 25% in sprayed orchards. Scab was present in the southern parts of Vermont, New Hampshire, and Maine in about the same proportions as in southern New England. The most seriously affected local area in New England seemed to be through Hero and Grand Isle in northwestern Vermont, where, in spite of excessive spraying, no protective covering could be maintained, owing to the heavy rains. The average fruit infection for the area was 25 to 30%. Throughout New England, losses in unsprayed orchards ranged from 50 to 100%, and defoliation was practically complete in many McIntosh orchards by September 15.

Infectious chlorosis or mosaic (virus). One local case was observed in Connecticut, where the disease was severe enough to cause the partial defoliation of several acres of trees.

Bitter pit (physiogenic). In Massachusetts losses were about normal, with greatest damage to Baldwin, Northern Spy, and King, slight losses on Cortland, and traces on McIntosh. The disease was very severe in 1 young Baldwin orchard in Rhode Island.

Fruit russet (physiogenic). Some rather severe cases were recorded in Connecticut, Massachusetts, and New Hampshire, on Baldwin and Delicious in particular.

Magnesium deficiency leaf scorch developed rather extensively in Massachusetts and southern New Hampshire, although later in the season than usual. On severely affected trees the fruits were badly stunted and dropped prematurely.

PYRUS COMMUNIS, PEAR

Fabraea maculata, leaf blight. A single case was observed in Rhode Island, of slight to moderate damage.

RUBUS sp., RASPBERRY

Elsinoë veneta, anthracnose, was found in 1 locality in Rhode Island and 1 in New Hampshire; in both cases it was general in the plantings, causing slight and moderate damage, respectively.

Mosaic (virus) was observed causing severe damage in 1 Rhode Island planting which has since been removed, and slight damage in 1 Maine planting.

VACCINIUM sp., BLUEBERRY

Microsphaera alni var. vaccinii, powdery mildew, occurred locally in 1 field in Columbia, Maine, causing slight damage.

Pucciniastrum goeppertianum (Calyptospora columnaris), rust witches-broom, occurred locally with slight damage in 1 field in Columbia, Maine.

Pucciniastrum myrtilli, leaf rust, was general and caused severe damage in 7 fields in Franklin and 2 fields in Columbia, Maine.

VITIS sp., GRAPE

Guignardia bidwellii, black rot. Single occurrences with no loss resulting were found in Connecticut, Rhode Island, and New Hampshire.

Plasmopara viticola, downy mildew, was present on most vines that had not been killed by late-season frosts in Massachusetts. There were no losses in yield.

DISEASES OF MISCELLANEOUS PLANTS

AESCULUS HIPPOCASTANUM, HORSECHESTNUT

Guignardia aesculi, leaf blotch, was prevalent throughout most of New England. Defoliation was most serious in Connecticut and Rhode Island. Severity gradually diminished toward northern New England.

CATALPA sp., CATALPA

Alternaria catalpae (Macrosporium catalpae), leaf spot, was generally prevalent in the New Haven, Connecticut, area where it was causing slight to moderate leaf spotting.

FRAXINUS spp., ASH

Puccinia peridermiospora (P. fraxinata), rust, caused severe defoliation of trees in coastal regions.

HELIANTHUS ANNUUS, SUNFLOWER

Erysiphe cichoracearum, powdery mildew, was generally distributed in 1 small planting in Hamden, Connecticut, causing no appreciable damage.

Puccinia helianthi (P. helianthi-mollis), rust, occurred in the same planting in Hamden; damage was very slight, if any.

NICOTIANA TABACUM, TOBACCO

Rhizoctonia sp., sore shin, was found to be general in fields surveyed in the Connecticut River Valley of Massachusetts, but most infections were light. Severe infection was found in only 1 field, where 35 to 40% of the plants were affected and the probable loss was 25%.

Mosaic (virus) was generally present in slight to moderate amounts in the Connecticut River Valley of Massachusetts. An occasional field contained 20 to 30% of the plants infected.

PRUNUS VIRGINIANA, CHOKE CHERRY

Dibotryon morbosum (Plowrightia morbosa), black knot, was present locally and causing slight damage in New Hampshire, Rhode Island, and Maine.

SONCHUS ARVENSIS, SOW THISTLE

Yellows (aster-yellows virus), was generally prevalent in Portland, Maine.

SUMMARY OF PLANT DISEASE SURVEYS IN NEW YORK IN 1943

Leon J. Tyler

The following is a brief summary of observations made, concerning plant pathogens, in New York State during the period August 1 to November 15, 1943.

PATHOGENS CAUSING DISEASES OF VEGETABLE CROPS

ALLIUM CEPA, ONION

Colletotrichum circinans was noted in central New York but was apparently not important this year.

Peronospora destructor was noted in central New York counties.

Urocystis cepulae was observed only in Oswego County fields (muckland). Up to 25% of the bulbs were diseased in some fields sown without treatment.

APIUM GRAVEOLENS var. DULCE, CELERY

Cercospora apii was generally distributed but the incidence in the fields visited was low.

Erwinia carotovora was seen only in 1 Oswego County field where about 2% of the plants were destroyed.

Septoria apii was found in almost every celery field visited in upstate New York. It was very destructive in some Oswego County fields on muckland.

ASPARAGUS OFFICINALIS, ASPARAGUS

Puccinia asparagi was general in distribution but prevalence and severity were very low.

BETA VULGARIS, BEET

Cercospora beticola was everywhere prevalent in garden beets and in many localities the organism was very destructive.

BRASSICA OLERACEA var. CAPITATA, CABBAGE

Erwinia carotovora was generally distributed in cabbage-growing areas, causing a soft rot of the cabbage head top. One field in Nassau County showed 15% rot of this type.

Fusarium oxysporum f. conglutinans (F. conglutinans) was observed in Ontario, Wayne, and Monroe Counties; it was destructive in only 1 of the fields visited.

Peronospora parasitica was general in up-state cabbage fields and home gardens, but little damage was done owing to lateness of its attack.

Phoma lingam was observed in widely separated counties. It was especially destructive in Cortland County where from 30 to 40% loss occurred in 60 acres set with plants grown from untreated seed.

Plasmodiophora brassicae was general in up-state counties where cabbage is grown. Prevalence usually was not more than 1 to 2%, but in 1 Cortland County field 50% of the plants were attacked.

Xanthomonas campestris was general wherever cabbage was grown but prevalence was very low.

CAPSICUM FRUTESCENS, PEPPER

Gloeosporium piperatum was especially destructive in 1 Dutchess County field.

Verticillium alboatrum was widely distributed but appeared unimportant in 1943.

Virus: tobacco mosaic virus, Marmor tabaci var. vulgare, was generally distributed but causing little damage.

CUCUMIS MELO, CANTALOUP

Cladosporium cucumerinum was noted once in Nassau County.

Colletotrichum lagenarium was noted infrequently in Nassau County.

Virus: cucumber mosaic virus, Marmor cucumeris var. vulgare, was noted infrequently in Nassau County.

CUCUMIS SATIVUS, CUCUMBER

Cladosporium cucumerinum was noted in central New York gardens and in Long Island fields.

Colletotrichum lagenarium was widely distributed but seen infrequently.

Erysiphe cichoracearum was general in distribution but caused little damage.

Erwinia tracheiphila was present in all fields and gardens visited, causing much destruction.

Virus: cucumber mosaic virus, Marmor cucumeris var. vulgare, was destructive in some Nassau County fields.

CUCURBITA MAXIMA, SQUASH, and CUCURBITA PEPO var. CONDENSA, SUMMER SQUASH

Erysiphe cichoracearum was widespread on winter squash.

Rhizopus nigricans was generally distributed. Considerable destruction due to this organism was noted in 1 Nassau County field.

Virus: cucumber mosaic virus, Marmor cucumeris var.vulgare, was generally distributed but appeared to have caused little damage.

CUCURBITA PEPO, PUMPKIN

Erysiphe cichoracearum was generally distributed in Nassau County and in up-state home gardens.

DAUCUS CAROTA, var. SATIVA, CARROT

Alternaria carotae (Macrosporium carotae) was observed causing slight leaf blight in almost all commercial fields and home gardens, and was frequently associated with Cercospora.

Cercospora carotae (C. apii var. carotae) was almost always present in carrot fields and gardens, causing slight damage.

LACTUCA SATIVA var. LONGIFOLIA, ROMAINE

Virus: aster-yellows virus, Chlorogenus callistephi var. vulgaris. Aster yellows rendered a half-acre field of romaine on Oswego County muck entirely worthless.

LYCOPERSICON ESCULENTUM, TOMATO

Alternaria solani was generally distributed over the State. Considerable damage was done in victory gardens and in commercial fields. In Wayne County fields the loss was as much as 1 to 5 tons per acre. In many fields the plants were completely defoliated at the height of the picking season. A considerable amount of fruit was culled because of fruit lesions.

Alternaria tomato was found only in Suffolk County causing nail-head spot of the fruit.

Cladosporium fulvum was generally distributed in the tomato-growing areas. Much destruction resulted in some Wayne and Ontario County fields.

Colletotrichum phomoides was general over the State. It was very destructive in a few fields observed in Niagara County and in 1 Dutchess County field.

Phytophthora infestans was general throughout upstate New York. Up to 25% of the fruits were attacked in some unsprayed Ontario County fields.

Septoria lycopersici was general over the State, but severe only in Genesee and Niagara Counties.

Virus: cucumber mosaic virus, Marmor cucumeris var. vulgare, was rather widely distributed but was rare in commercial fields, being found more frequently in home gardens.

Tobacco mosaic virus, Marmor tabaci var. vulgare, was general but damage was moderate.

Double streak, mixture of tobacco mosaic virus and some potato mottle virus, Marmor dubium var. vulgare, was general but usually low in prevalence.

PASTINACA SATIVA, PARSNIP

Cercospora pastinacae was general in central New York home gardens.

PHASEOLUS LUNATUS, LIMA BEAN

Diaporthe phaseolorum was noticed only in central New York counties where damage was insignificant.

Phytophthora phaseoli was observed in 1 field in Suffolk County. Weather was unfavorable for the development of an epiphytotic.

Pseudomonas syringae was general over the State but low in prevalence and severity.

PHASEOLUS VULGARIS, BEAN

Colletotrichum lindemuthianum was generally distributed over up-state New York but was destructive only in Madison, Oneida, and Genesee Counties.

Fusarium spp. were found causing dry root rot of marrow bean, pea bean, Red Kidney, and snap bean throughout central and northwestern New York. Usually the disease was found to be more destructive to pea bean than to other kinds, especially in Livingston, Monroe, and Orleans Counties where infection ran up to 50% in some fields. Thirty percent infection was recorded on Red Kidney beans in the same area.

Pseudomonas medicaginis var. phaseolicola occurred generally on snap beans and dry shell beans in the State, but field prevalence and severity were usually very slight.

Xanthomonas phaseoli was generally prevalent in all sections of New York State and caused much damage in the northwestern and central parts. It was more destructive than during the past 2 years.

Bean virus 1, Marmor phaseoli, was present wherever beans were grown. Prevalence usually varied from a trace to 12%. From 60 to 80% infection was found in Niagara County, where it was especially destructive to pea beans and French Horticultural beans.

Bean yellow-mosaic virus was generally distributed wherever beans were grown.

RHEUM RHAPONTICUM, RHUBARB

Phyllosticta straminella was generally prevalent on rhubarb but did not appear destructive to the plants examined.

SOJA MAX. See with forage crops section.

SOLANUM MELONGENA, EGGPLANT

Alternaria solani was found causing leaf lesions on eggplant in many gardens but did very little damage.

Phomopsis vexans was prevalent in central New York. In some home gardens up to 30% of the fruit was infected.

Verticillium albo-atrum was generally distributed wherever eggplants were grown. Up to 50% infection was noted in some Dutchess County fields.

SOLANUM TUBEROSUM, POTATO

Alternaria solani was prevalent in all up-state potato-growing areas. Destructive attacks were reported on Houma potatoes in Oswego County and in some Onondaga County fields.

Corynebacterium sepedonicum is established in 24 of 62 New York counties. Its prevalence is known to have been intensified by the introduction and use of out-of-state "selected" seed. In 1 Steuben County commercial field of Katahdin up to 20% of the tubers were rotted.

Ditylenchus dipsaci (Anguillulina dipsaci) was observed only near Hicksville on Long Island.

Erwinia phytophthora was found frequently in certain counties where out-of-state seed was planted.

Fusarium solani f. eumartii (F. solani var. eumartii) was generally distributed in up-state potatoes. Four out of 25 Genesee County fields exhibited from 1 to 15% of the plants attacked.

Heterodera marioni was observed in Nassau County on Long Island.

Phytophthora infestans was widely distributed over the State by August 16 and destructive attacks were noted in muckland potatoes by August 21. It became destructive in many fields of upland potatoes and to home gardens by September 10. The varieties Sequoia and Pebago appeared to be less destructively affected than Katahdin and Rural. In Steuben County, tubers seen in the field and in warehouse bins exhibited from none to 5% blight; usually such tuber lots showed 1 to 2%. Long Island potatoes were mostly mature before the organism became destructive.

Virus? (calico disease). A disease exhibiting symptoms at least similar to those of the calico disease was observed in a few fields in Wayne, Ontario, Orleans, Monroe, and Erie Counties. Not more than 1 or 2 plants were found during the brief examination of any one field.

SPINACIA OLERACEA, SPINACH

Pythium debaryanum, damping-off, was everywhere prevalent in spinach, doubtless because of unusually favorable weather for the disease.

CEREALS, GRASSES, AND FORAGE PLANTS

AVENA SATIVA, OATS

Puccinia coronata was generally prevalent and destructive in central and northwestern counties.

Puccinia graminis var. avenae was generally distributed in very light amounts in Ontario, Livingston, Wyoming, and Genesee County fields.

HORDEUM VULGARE, BARLEY

Puccinia anomala was generally distributed in up-state New York and was destructive in late barley fields.

Puccinia graminis var. hordei was generally distributed in western counties and was destructive to late barley.

MEDICAGO SATIVA, ALFALFA

Ascochyta imperfecta was general in central New York.

Corynebacterium insidiosum is general over the State wherever alfalfa is grown. As high as 50% infection has been seen in some fields and some of these were 2-year-old stands.

Pseudopeziza medicaginis was present in almost all fields. It was found to be causing severe leaf shedding in Cayuga and Chenango Counties.

Pseudoplea trifolii was noticed only in Madison County.

Stagonospora meliloti was generally distributed but causing very little damage.

Stemphylium sarcinaeforme (Macrosporium sarcinaeforme) was everywhere prevalent but causing very little damage.

SOJA MAX, SOYBEAN

Alternaria sp. (A. atrans ?) was general in distribution, especially in victory garden soybeans.

Cercospora sojina was found near Marathon in Cortland County. Apparently this is the first report of its occurrence in New York State.

Peronospora manshurica was generally distributed in central and western New York. Destructive occurrence was noted on the variety Seneca in Tompkins County.

Pseudomonas glycinea was widespread and destructive.

Virus: pea virus 1, Marmor pisi, was generally distributed wherever soybeans are grown. Usually not more than 1% of the plants are affected but sometimes as high as 15% infection has been found.

TRIFOLIUM PRATENSE, RED CLOVER

Cymadothea trifolii (Dothidella trifolii)was observed in central New York. Moderately severe infection was noted on 25% of the plants in some Cayuga County fields.

Erysiphe polygoni was present in almost every red clover field and was causing much destruction in many.

Pseudopeziza trifolii was generally distributed over the State. It causes much shedding of leaves in central New York Counties.

Stemphylium sarcinaeforme (Macrosporium sarcinaeforme) was general in distribution but was causing little damage.

Uromyces trifolii was general in red clover fields. In central New York some fields were destructively affected.

Virus: common pea-mosaic virus, Marmor leguminosarum, was general in distribution and very severe in many fields.

ZEA MAYS, CORN

Diplodia zeae, ear rot, was generally distributed in field corn and caused a loss of probably 2%.

Fusarium moniliforme, ear rot, was generally distributed in field corn but caused little damage.

Gibberella zeae (G. saubinetii), ear rot, was general on field corn but damage was insignificant.

Ustilago maydis (U. zeae), ear smut, was generally distributed but everywhere low in prevalence and the loss did not exceed 0.5% for the State.

FRUIT CROPS

AMYGDALUS PERSICA, PEACH

Cladosporium carpophilum was generally distributed in New York peach areas but inconspicuous because of failure of the peach fruit crop.

Monilinia fructicola was generally distributed in peach-growing areas, but because of the almost complete failure of the crop due to weather conditions the pathogen was not particularly evident in orchards visited.

Taphrina deformans (Exoascus deformans) was noted in a few orchards along Lake Ontario in northwestern New York.

Virus: X-disease virus, Marmor lacerans (yellow-red virosis, X-disease). In the Hudson Valley peach area many orchards located near choke cherry exhibit up to 50 to 75% diseased trees.

MALUS SYLVESTRIS, APPLE

Erwinia amylovora was general but everywhere low in prevalence and severity.

Gymnosporangium clavipes (G. germinale)was generally distributed in eastern New York apple areas and was more destructive in 1943 than during the past 5 years. In sprayed trees fruit infection varies from 2 to 10%.

Gymnosporangium juniperi-virginianae was general in the Hudson Valley area, with more fruit infection this year than last. Up to 15% of the fruit was destroyed on unsprayed trees.

Physalospora obtusa was found in almost all orchards but was causing little loss.

Venturia inaequalis was generally distributed and everywhere destructive. The crop in the Hudson Valley was reduced by 10%. In Clinton and Essex Counties, the crop of U. S. Fancy No. 1 apples was reduced 20 to 25%.

PRUNUS AVIUM, SWEET CHERRY, AND P. CERASUS, SOUR CHERRY

Coccomyces hiemalis was generally distributed and destructive in all sweet and sour cherry-growing regions. Complete defoliation resulted from the leaf spot as early as August 25 in the Hudson Valley area.

PYRUS COMMUNIS, PEAR

Erwinia amylovora was general in distribution and considerable destruction was noted in some Hudson Valley orchards.

Gloeodes pomigena was found to be generally distributed in the Hudson Valley and in some unsprayed orchards it completely ruined most of the fruit.

RIBES sp., GOOSEBERRY

Mycosphaerella grossulariae was prevalent and destructive.

Sphaerotheca mors-uvae was prevalent and very destructive in Ontario County.

RIBES SATIVUM, RED CURRANT

Pseudopeziza ribis was prevalent and destructive in Ontario County plantings.

RUBUS spp., BLACKBERRY

Elsinoë veneta (Gloeosporium venetum) was general and very destructive in some western New York plantings.

Septoria rubi was general but not destructive.

RUBUS OCCIDENTALIS, BLACK RASPBERRY, and RUBUS IDAEUS, RED RASPBERRY

Agrobacterium tumefaciens was general in distribution but was severe in only one planting visited.

Didymella applanata was generally distributed but did not appear to be especially destructive in 1943.

Elsinoë veneta (Gloeosporium venetum) was prevalent in Ontario County plantings but not destructive.

Gymnoconia peckiana (G. interstitialis) was noted in Ontario County plantings but was not destructive this year.

Septoria rubi (probably Sphaerulina rubi) was generally distributed but did not occur destructively.

Sphaerotheca humuli was especially prevalent on and destructive to the variety Latham.

Verticillium albo-atrum was seen infrequently in Ontario County plantings.

VACCINIUM CORYMBOSUM, BLUEBERRY

Microsphaera alni var. vaccinii. The variety Pioneer appears to be more susceptible than some other varieties in Oswego County plantings.

Phomopsis spp. Pioneer exhibited more Phomopsis gall than did other varieties.

Virus: blueberry stunt virus. Blueberry stunt is becoming very prevalent in Oswego County plantings. Pioneer appears to be more susceptible than Rubel, Jersey Concord, and Rancocas.

VITIS spp., GRAPE

Guignardia bidwellii was generally distributed wherever grapes were grown but was causing appreciable loss only in the variety Duchess.

Plasmopara viticola was generally distributed in Ontario, Steuben, and Yates County vineyards, with much damage being done to the Delaware variety. It was unimportant in the Hudson Valley grape region this year.

Uncinula necator was very destructive in some vineyards in Steuben, Ontario, and Yates Counties.

SPECIAL CROPS

HUMULUS LUPULUS, HOP

Colletotrichum humuli, anthracnose, was general in the hop-growing area. A 1-acre hop yard in Oneida County sustained a 25% loss.

Fumago vagans, sooty mold, was generally distributed. About 1% of the entire crop was destroyed by this pathogen.

Pseudoperonospora humuli, downy mildew, was general in the New York hop-growing area. Attacks during May were destructive because of delay in operations due to the wet weather. A considerable loss from this disease was sustained on about 150 acres.

Sphaerotheca humuli, powdery mildew, was epiphytotic in Franklin County but losses were low.

Virus: virus-like disease of hops. From 10 to 30% of the hop plants on 16 acres in Oneida County were destructively affected.

PLANT DISEASE SURVEYS IN PENNSYLVANIA, 1943

Leon J. Tyler

Following is a brief summary of observations made concerning plant diseases in Pennsylvania during the period from August 1 to November 19, 1943.

VEGETABLE CROPS

ABELMOSCHUS ESCULENTUS, OKRA. Macrosporium sp. was causing leaf spot in Montgomery and Susquehanna County gardens.

ALLIUM CEPA, ONION. Stemphylium botryosum (Macrosporium parasiticum) was observed in trace amounts in Wyoming and Susquehanna Counties, causing leaf break of the onion tops.

APIUM GRAVEOLENS, CELERY. Cercospora apii was observed in amounts ranging from a trace on 25% of the plants in one Cumberland County field to moderately severe on all plants in one Berks County field. Erwinia carotovora was severe in one large Berks County field, and slight in one Lancaster County garden. Infection by Septoria apii ranged from trace to light on most of the plants seen in Cumberland County to severe on all plants seen in Columbia County. Virus yellows affected 3% of the plants in one Luzerne County field.

ASPARAGUS OFFICINALIS, ASPARAGUS. Fusarium spp. occurred in very slight amounts in one Bucks County field. Traces of Puccinia asparagi were noted in a Bucks County commercial field.

BETA VULGARIS, BEET. Cercospora beticola occurred in light to moderate amounts in Bucks and Dauphin County fields and gardens. Boron deficiency was very severe in 2 Bucks County fields.

BRASSICA OLERACEA var. BOTRYTIS, CAULIFLOWER. Alternaria circinans (A. brassicae) was noted in Montgomery County, in trace amounts.

BRASSICA OLERACEA var. BOTRYTIS, BROCCOLI. Alternaria spp. occurred in slight amounts on most of the plants seen in a few Luzerne County fields. A trace of Phoma lingam was observed in one Luzerne County field.

BRASSICA OLERACEA var. CAPITATA, CABBAGE. Alternaria spp. were causing leaf spot in Columbia and Montgomery Counties but the infection observed was very slight. Phoma lingam occurred in traces in some Luzerne County fields. Plasmodiophora brassicae was noted in trace amounts wherever cabbage was examined. Xanthomonas campestris was noted in almost every cabbage field entered but infection was never more than a trace.

CAPSICUM FRUTESCENS, PEPPER. Fusarium sp. was noted causing a trace of wilt in one Luzerne County field. Glocosporium piperatum, usually followed by Alternaria sp., caused severe fruit spot in one Luzerne County field.

Mosaic caused by the tobacco mosaic virus was observed in Berks and Columbia Counties, infection ranging from a trace to 3%. Slight infections of spotted wilt were noted in one Luzerne County field.

Sunscald followed by Alternaria spp. was prevalent in almost every planting of peppers seen in Luzerne, Susquehanna, and Wyoming Counties. Usually from 5 to 25% of the fruits were destroyed.

CUCUMIS MELO, CANTALOUP. Alternaria cucumerina (Macrosporium sp.) was causing light to moderate leaf spotting in Bucks County fields. Very slight infection with Colletotrichum lagenarium was observed in a Bucks County field. Light infection by Erysiphe cichoracearum occurred on a few plants noted in Bucks County. Pseudomonas lachrymans occurred in very slight infections on a few plants in one Montgomery County field.

CUCUMIS SATIVUS, CUCUMBER. A trace of Colletotrichum lagenarium was noted in one Bucks County field. Erwinia tracheiphila was very generally distributed at least in the central, southeastern, eastern, and northeastern parts of the State, infection ranging from a trace to moderately severe. Erysiphe cichoracearum was noted in one Montgomery County field.

CUCURBITA MAXIMA, SQUASH. Light infection by Colletotrichum lagenarium was observed in Bucks County. Mycosphaerella citrullina was causing a destructive fruit spot of white squash in a Bucks County field. Moderate fruit infection by Rhizopus nigricans was observed in Luzerne County. Occasional plants affected by the cucumber mosaic virus were observed in a Luzerne County planting.

CUCURBITA PEPO, SQUASH. Phyllosticta sp. was causing moderate leaf spotting on 25% of the plants in a Berks County field.

DAUCUS CAROTA, CARROT. Cercospora carotae and Alternaria carotae, frequently associated, were found causing slight to moderate leaf spotting on a trace to 10% of the plants in Bucks, Columbia, and Montgomery Counties. Heterodera marioni was found causing slight damage in one large Bucks County field. A trace of Rhizopus nigricans was found in one Bucks County field.

LACTUCA SATIVA, LETTUCE. A trace of leaf spot caused by Septoria sp. was found in Montgomery County.

LYCOPERSICON ESCULENTUM, TOMATO. Alternaria solani was prevalent wherever tomatoes were grown. Infection varied from a trace to moderate on most plants in the central, southeastern, and eastern counties. Severe infection was noted in Montgomery County.

A trace of Alternaria tomato was noted on a few plants in Lancaster and Franklin Counties.

Cladosporium fulvum was noted on greenhouse plants and was severe in one greenhouse, in Columbia County. On outdoors tomatoes it was severe in 2 fields in Lancaster County, and a trace was noted in one garden in Adams County.

Traces to light amounts of Colletotrichum phomoides were observed in all central, southeastern, and southern counties.

Septoria lycopersici was generally distributed in central and southeastern counties but in most cases infection varied from a trace to only slight on most plants.

Xanthomonas vesicatoria was observed in Bucks, Lancaster, and Franklin Counties. In one Franklin County field 90% of the fruits showed spots due to this organism. Only traces were observed in the other 2 counties.

The tobacco mosaic virus was general in distribution but usually low in prevalence.

Sunscald (physiogenic) was generally prevalent in central and southeastern counties. Occasionally it was very severe where early blight was severe.

Fruit pox (undetermined origin) was noted in Cumberland County but appeared to be of slight importance.

PASTINACA SATIVA, PARSNIP. Severe infection by Cercospora pastinacae was observed on 75% of the plants in one Cumberland County planting.

PHASEOLUS LUNATUS, LIMA BEAN. Alternaria sp. caused large circular leaf lesions and was severe in one Snyder County victory garden. Pseudomonas syringae was generally distributed in fields visited in Luzerne, Berks, and Columbia County, infection ranging from light to moderately severe on all plants.

PHASEOLUS VULGARIS, BEAN. Colletotrichum lindemuthianum, usually in slight infections, was observed in victory gardens in central and northeastern counties.

A trace of Fusarium spp. causing dry root rot was noted in Bucks County.

Pseudomonas medicaginis var. phaseolicola was widely distributed, but not more than a trace was observed in fields examined.

Rhizoctonia solani was noted in Bucks County but appeared to be unimportant.

Uromyces phaseoli var. typica (U. appendiculatus) was widely distributed but did not appear to be destructive in 1943.

Xanthomonas phaseoli was widely distributed in the State, infection varying from a trace to moderately severe on 25 to 100% of the plants in fields examined.

Bean mosaic (bean virus 1) was widely distributed. In Dauphin and Bucks Counties infection varied from 5 to 15%.

Yellow mosaic was noticed in gardens and fields throughout the central and northeastern counties.

RHEUM RHAPONTICUM, RHUBARB. Phyllosticta straminella was causing a trace of leaf spot on all plants in a Lebanon County planting.

SOJA MAX. See with forage crops section.

SOLANUM MELONGENA, EGGPLANT. A trace of Alternaria solani occurred on all plants seen in Columbia and Berks Counties. Phomopsis vexans caused slight leaf spotting in one Luzerne County field and severe fruit spot in a field in Bucks County. Verticillium albo-atrum was generally prevalent wherever eggplant was seen.

SOLANUM TUBEROSUM, POTATO. Actinomyces scabies was everywhere prevalent but was destructive in only a few fields.

Alternaria solani was widely distributed but no destructive attacks were found.

(Corticium solani) see Pellicularia filamentosa

Corynebacterium sepedonicum caused widespread destruction at least in Potter and Warren Counties. The percentage of tubers attacked usually ranged from 1 to 6 but one field was seen in which 25 to 50% of the tubers were diseased. About 30% of the fields visited exhibited some ring rot.

A trace of Erwinia phytophthora was noted in Lackawanna County.

Fusarium solani f. eumartii (F. solani var. eumartii) was widely distributed in potato-growing areas. A few fields in Lackawanna County exhibited from 1 to 3% infection. In Warren County from 0.5 to 1% of the plants were attacked in fields visited.

Pellicularia filamentosa (Corticium solani) was widespread but not particularly destructive.

Phytophthora infestans was generally distributed in potato-growing areas. From tuber counts in Potter and Warren Counties at digging time, it was found that from 1 to 2% of the tubers in some fields exhibited blight lesions.

Of the virus diseases, leaf roll was apparently generally distributed. Counts in 3 fields in Lackawanna County indicated from 1 to 3% of the plants attacked. A bare trace of spindle tuber was seen in Potter and Warren Counties. Yellow dwarf was widely distributed but usually not more than 1% of the plants were attacked. Giant hill and mouse ear were observed in Lackawanna County.

CEREALS AND FORAGE CROPS

MEDICAGO SATIVA, ALFALFA. Ascochyta imperfecta was widely distributed. In some Northampton County fields as high as 50% of the plants were severely diseased.

Corynebacterium insidiosum was widely distributed, as shown by its occurrence in at least 25 counties and in 79 of 122 fields examined. Infection ranged from a trace to 50% of the plants. A yield reduction of 20% would appear to be a conservative estimate of the loss sustained.

Pseudopeziza medicaginis was widely distributed all over Pennsylvania. Infection ranged from a trace on a few plants to moderate on most of the plants. The heaviest infections were noted in eastern and southeastern counties.

SOJA MAX, SOYBEAN. Alternaria atrans was observed once, in a Snyder County victory garden.

Fusarium sp. was isolated from diseased roots of plants taken from a Franklin County field.

A trace of Peronospora manshurica was observed October 22 on 5% of the plants in a field of late soybeans in Washington County.

Pseudomonas glycinea was widespread in the State. In Franklin and Northampton Counties, infection was light on 50% and 100%, respectively, of the plants.

Rhizoctonia solani was isolated from the roots of plants taken from one Franklin County field.

Sphaceloma sp. was identified on diseased soybean plants taken from a Franklin County field. Stem and petiole lesions were presumably caused by the same fungus.

TRIFOLIUM PRATENSE, RED CLOVER. Erysiphe polygoni was generally distributed, with moderate infection in most fields.

Stemphylium sarcinaeforme (Macrosporium sarcinaeforme) was noted in Adams, Cumberland, and Northampton Counties, in amounts ranging from a trace on 10% of the plants to light on 90%.

Pseudopeziza trifolii was widely distributed in the State. Infection ranged from a trace of infection on a trace of the plants, to slight infection on 90% of the plants.

Uromyces trifolii was generally distributed but destructive occurrence was not observed.

ZEA MAYS, CORN. Diplodia zeae (ear rot) was generally distributed in southeastern and central counties. In 27 of 59 fields examined, ear rot occurred on from 0.5 to 9% of the ears.

Fusarium moniliforme was widely distributed. It occurred in 49 of the fields examined, scattered over 8 central to southeastern counties. Infection ranged from 1 to 15% of the ears.

Gibberella zeae (G. saubinetii) was observed in 15 of 59 fields, in the southeastern and central parts of the State. From 0.5 to 2% of the ears were affected.

Nigrospora sphaerica (Basisporium gallarum)(ear rot) was observed in 11 of 59 fields in the southeastern and central parts, on 0.5 to 3% of the ears.

Penicillium-Aspergillus complex was widely destributed this year owing to late maturity and to methods of harvesting. It was found in almost all lots of corn and from 0.5 to 50% of the ears were affected.

Pythium (? arrhenomanes). A trace was found in 4 of 6 Cumberland County fields examined.

Ustilago maydis (U. zeae). From 0.5 to 3% was found on ears in 29 of 59 lots examined.

FRUIT CROPS

AMYGDALUS PERSICA, PEACH. Cladosporium carpophilum was observed in Adams, Cumberland, Franklin, Lancaster, and Snyder Counties; infection varied from a trace to moderate.

Monilinia fructicola was widely distributed in central, southeastern, and eastern counties. Infection ranged from a trace to moderate in sprayed trees, and light to severe in unsprayed or poorly cared-for trees. Late varieties appeared most destructively affected.

Peach yellows (virus, Chlorogenus persicae var. vulgaris). In one Montgomery County orchard 14% of the trees were affected.

AMYGDALUS PERSICA var. NECTARINA, NECTARINE. Cladosporium carpophilum was moderately severe in one Cumberland County orchard. Monilinia fructicola was severe in one Cumberland orchard.

MALUS SYLVESTRIS, APPLE. Erwinia amylovora was generally distributed but was destructive only in abandoned or poorly managed orchards.

Glocodes pomigena was observed in Lehigh and Snyder Counties. Infection ranged from severe in unsprayed to none in sprayed trees.

Gymnosporangium clavipes (G. germinale) was noted in Adams, Franklin, Bucks, Lehigh, and Snyder Counties, usually in not more than traces.

Gymnosporangium juniperi-virginianae was observed in Adams, Bucks, Franklin, Lebanon, Lehigh, and Snyder Counties. Infection was severe in unsprayed trees in Adams County. In other areas it usually varied from a trace to slight.

Helminthosporium papulosum was noted frequently in Adams, Lehigh, and Montgomery Counties.

Mycosphaerella pomi was observed in trace amounts in Bucks and Lehigh Counties.

Physalospora obtusa was observed in Snyder, Montgomery, Lebanon, and Lehigh Counties. Infection ranged from a trace to severe on unsprayed trees.

Venturia inaequalis was widely distributed, with much damage done to unsprayed trees.

PRUNUS spp., PLUM. Coccomyces prunophorae was moderately severe in a few Luzerne County orchards. Heat canker (non-parasitic) was moderately severe on the fruits on all trees in one Luzerne County orchard

PRUNUS spp., CHERRY. Coccomyces hiemalis was general and very destructive.

RUBUS OCCIDENTALIS, BLACK RASPBERRY, and R. IDAEUS, RED RASPBERRY. Agrobacterium tumefaciens was severe in one Snyder County planting. Didymella applanata was generally distributed in Luzerne, Snyder, Susquehanna, and Wyoming County plantings; infection was light to moderate. Elsinoë veneta was generally prevalent in Luzerne and Snyder County plantings. Septoria rubi (Sphaerulina rubi) occurred in light infections in a few Susquehanna and Wyoming County plantings.

Mosaic (red raspberry mosaic virus, Marmor rubi)was seen in almost every planting visited in Lackawanna and Luzerne Counties. Usually the percentage of diseased plants was very low.

VITIS sp., GRAPE. Glomerella cingulata was affecting 1% of the bunches in a Lebanon County vineyard. Guignardia bidwellii was observed in Adams, Lebanon, and Snyder Counties; in terms of bunches affected infection ranged from a trace to moderate. Plasmopara viticola was observed in Adams, Lebanon, and Lehigh Counties; infection ranged from a trace to light on as many as 90% of the plants.

SUMMARY OF OBSERVATIONS ON PLANT DISEASES IN THE NEW JERSEY-DELAWARE-MARYLAND AREA FOR THE PERIOD JULY TO DECEMBER, 1943

E. A. Walker

VEGETABLE CROPS

APIUM GRAVEOLENS, CELERY

Early blight (Cercospora apii) was of little economic importance. Late blight (Septoria apii)was observed in most plantings causing moderate to severe damage. Cracked stem (non-parasitic) occurred in only slight amounts in any field. These observations were all made in New Jersey.

ASPARAGUS OFFICINALIS, ASPARAGUS

Asparagus plantations were examined in New Jersey. In most fields visited an average of about 2 to 3% of the plants were affected by a stem rot with which Fusarium sp. was associated. Rust (Puccinia asparagi) was generally absent in midsummer, but increased during the fall. The heaviest attack observed developed in the vicinity of Woodbury in Gloucester County. In some fields about 80% of the plants were affected. In heavily infested areas parasitization of the fungus by Darluca filum was characteristic.

BETA VULGARIS, BEET

Leaf spot (Cercospora beticola) was slight to moderate in most fields in New Jersey. Stands were very poor except in irrigated sections.

BRASSICA OLERACEA var. ACEPHALA, KALE

Yellows (Fusarium oxysporum f. conglutinans) reduced the stand in a 15-acre field in Maryland about 20%.

BRASSICA OLERACEA var. CAPITATA, CABBAGE

Alternaria leaf spot generally was not destructive in NewJersey, but in a large field near Woodville A. brassicae (A. herculea) was causing severe damage to outer leaves and sucker sprout leaves.

Yellows (Fusarium oxysporum f. conglutinans) was seldom observed to be causing more than 0.5% loss in New Jersey. It was rather common in Maryland victory gardens where care was not used to select resistant varieties.

Black rot (Xanthomonas campestris) was generally unimportant in both New Jersey and Maryland. Only occasional fields were observed with severe infection.

In New Jersey, after rains in October, cracked heads (non-parasitic) damaged about 10% of the crop being harvested.

BRASSICA RAPA, TURNIP

White leaf spot (Cercosporella albo-maculans) was causing serious loss in fields near Newfield and Elmer in southwestern New Jersey, where 100% of the plants were affected. It was very common in most turnip patches in Maryland late in the season.

Mosaic (virus) affected 2% of the crop in the Newfield area of New Jersey.

CAPSICUM FRUTESCENS, PEPPER

Alternaria leaf spot (Alternaria solani) was found in one field in New Jersey in association with the Cercospora spot.

Cercospora leaf spot (Cercospora capsici) was seldom observed in New Jersey. It was noted on scattered leaves in a few fields in Maryland. In plantings near Seaford, Delaware, the disease was very severe on the leaves and some fruit pedicels.

Wilt associated with Fusarium sp. or other organisms was more destructive than other diseases in New Jersey. All fields visited showed some wilt, and in many fields from 25 to 30% was observed, while all plantings would average about 5% of the plants killed. F. annuum was isolated in some cases. Wilt associated with Fusarium sp. was noted in all fields visited in Maryland also, the average damage being about 3% of the plants killed. Some fields showed 8%, one field 20%, and the worst field observed showed 50% of the plants killed.

Anthracnose (Glomerella cingulata) was seldom observed in New Jersey. In Maryland from 6 to 8% loss of the fruit was noted in 2 fields.

Bacterial spot (Xanthomonas vesicatoria) was causing about 20% defoliation of red peppers in the Vineland section of New Jersey.

Mosaic and other virus diseases occurred in nearly all fields in New Jersey; were prominent in Delaware; in Maryland about 5% loss was noted in some fields.

An undetermined fruit rot was causing about 1% loss in one Maryland field.

Drought caused 10% loss in New Jersey, in the pepper section where rows were ridged.

Sun scald reduced the crop of salable fruits in New Jersey about 30%. Loss was slight in pepper-growing areas in Delaware. In Maryland some was observed in all fields visited and 50% loss was noted in one field in Anne Arundel County.

CITRULLUS VULGARIS, WATERMELON

Leaf blight (Alternaria cucumerina) was observed in one field of late melons near Seaford, Delaware, where nearly all the leaves were affected and many were killed, resulting in a large crop of small melons.

In Maryland, bacterial wilt (Erwinia tracheiphila) caused the death of 8 to 10% of the plants in one field, and was generally distributed in most patches visited.

CUCURBITA PEPO, PUMPKIN

Choanephora cucurbitarum was isolated along with Fusarium sp. from diseased roots of wilt-affected plants in Maryland and New Jersey, but whether it has any causal relation to the disease is not known as yet.

Wilt (Fusarium sp.) was very destructive in both States. In New Jersey losses of over 60% were estimated in some fields, and the loss in plants killed would average 15% for the State. In Maryland some fields showed from 30 to 50% of the plants killed. The State loss would average about 10%. In some cases wilt was confused with damage caused by the squash vine borer.

Downy mildew (Pseudoperonospora cubensis) was found on leaves in one New Jersey field, but the fruit was nearly mature and no damage was apparent.

Rootknot (Heterodera marioni) was severe, affecting about 10% of the plants, in a sandy field in Anne Arundel County, Maryland.

CUCURBITA PEPO var. CONDENSA, SUMMER SQUASH

Blossom blight and blossom-end rot caused by Choanephora cucurbitarum was observed in several victory gardens in Maryland. Bacterial wilt (Erwinia tracheiphila) damaged plants on low land in Maryland. Wilt (Fusarium sp.) caused serious damage to most squash plantings in New Jersey and Maryland. In some fields in Maryland 50% of the plants were killed.

IPOMOEA BATATAS, SWEETPOTATO

Pox (Actinomyces ipomoeae) was more prevalent than usual in all areas.

Black rot (Ceratostomella fimbriata)[1] was not observed in the field in Maryland at harvest but developed rapidly in storage and loss will exceed 10%. In New Jersey and Delaware it was causing about 1% and 1.5% loss, respectively, in fields observed at harvest time.

Stem rot (Fusarium spp.) was observed only to a very slight extent in Delaware, but in New Jersey and Maryland it occurred to some extent in most fields, causing losses averaging 3% in the former and about 4% in the latter. In some fields in New Jersey from 10 to 30% of the plants were wilted and killed. In Maryland up to 20% infection was noted

Scurf (Monilochaetes infuscans) occurred in most fields in New Jersey and Delaware but caused little damage. In Maryland the disease was severe in all fields and contributed greatly to root cracking.

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[1] [According to Ross W. Davidson (Jour. Agr. Res. 50:800. 1935) this fungus is an Endoconidiophora, and he makes the combination E. fimbriata (Ell. & Halst.) Davidson].

Soft rot (Rhizopus nigricans) developing on the stem end accounted for about 2% loss in one New Jersey field following a late wet harvesting season. Roots from this field would suffer considerable loss in storage. In Delaware this rot was seldom observed at harvest but since the roots were harvested while full of water, considerable loss may result in storage if they are not properly cured.

Cracking of the roots following rains after the first of October was frequently noted in New Jersey, causing a loss of about 2%. It was severe in most Delaware fields where fully 10% or more of the crop was damaged in this manner. In Maryland it was very severe in low land. The average loss in this State amounted to 8 to 10%, and some fields were not dug because of this condition.

Drought reduced the New Jersey crop about 30%, and resulted in the marketing of a larger number of small size sweetpotatoes than usual. In Maryland also the crop as a whole was reduced about 30% by drought, and the yield of roots grading U. S. No. 1 to about 25% of normal.

LYCOPERSICON ESCULENTUM, TOMATO

Early blight (Alternaria solani)was present to a damaging extent on the foliage in all fields visited in New Jersey. In Delaware and Maryland it caused defoliation of the lower leaves of the late crop; stem infection was observed to some extent in Delaware and was abundant in Maryland. A reduction in yield of about 4% occurred in Delaware.

Leaf mold (Cladosporium fulvum) was observed generally distributed in one field near Cordova, Maryland. Outdoors infection by this fungus is not common in the State.

Bacterial canker (Corynebacterium michiganense) was observed in one Maryland field. The loss in the field averaged 3%, but in some parts of it 50% of the plants were killed.

Fusarium wilt (Fusarium oxysporum f. lycopersici) caused a loss in Maryland averaging approximately 5%. It was very severe near Cambridge, where the average loss was 8% and 35 to 50% of the plants were missing in parts of some fields. Fusarium wilt and verticillium wilt (Verticillium albo-atrum) together caused death of about 5% on the average of plants in Delaware and New Jersey commercial tomato sections. In New Jersey from 16 to 33% of the plants in some fields were killed by one or the other.

Late blight (Phytophthora infestans)was noted only in Maryland, where a slight amount was observed on the foliage in 2 fields late in the season, causing no damage.

Bacterial wilt (Pseudomonas solanacearum) was severe in one Maryland field.

Leaf spot (Septoria lycopersici) caused serious defoliation in some fields in northwestern New Jersey. Some defoliation was observed in the Cheswold area of Delaware, with reduction in yield of about 1%. The disease caused slight damage on the Eastern Shore and moderate damage in northern and western Maryland. Some defoliation was noted.

Gray leaf spot (Stemphylium solani) may have caused some of the damage attributed to early blight in New Jersey.

Mosaic (virus) occurred in most fields in Delaware but was causing only slight damage. It was observed in most plantings in New Jersey also.

Blossom-end rot (physiogenic) was more prevalent than usual in New Jersey and caused a loss of more than 15%. Late tomatoes in Delaware and Maryland were badly affected but the disease decreased in severity after the middle of September. Loss in Delaware was fully 5%, in Maryland about 8%. From 30 to 50% of the fruits were affected in some Maryland fields.

Stem-end cracking of the fruit was observed in the late crop in Maryland following the rains after the middle of September.

Drought reduced the late-season crop in New Jersey and Maryland by 30%, and was responsible for the large number of small fruits. The early crop in New Jersey was slightly affected.

PETROSELINUM CRISPUM, PARSLEY

Stunt (virus) was found in one New Jersey planting near Elmer.

RADICULA ARMORACIA, HORSERADISH

White rust (Albugo candida), leaf spots caused by Alternaria brassicae (A. herculea) and Colletotrichum sp., and downy mildew (Peronospora parasitica) were observed in all of the mostly small plantings examined in New Jersey.

SOLANUM MELONGENA, EGGPLANT

Anthracnose (Colletotrichum atramentarium) was seldom observed in New Jersey plantings. About 8% of the fruits in one field in Anne Arundel County, Maryland, were affected.

Wilt (Fusarium sp) caused an average of about 6% loss to truck growers in Maryland. Wilt due to Fusarium and to Verticillium albo-atrum was the most destructive disease of eggplants in New Jersey. Most fields contained 1% or more, with an average of about 5%, while in some fields from 30 to 40% of the plants were wilted. Verticillium was possibly the more important in this State.

Stem canker and fruit rot (Phomopsis vexans) caused no damage to the early crop in New Jersey, but loss in the late crop amounted to 30 to 50%. Stem cankers caused the death of some plants before frost. In one field observed in Maryland about September 15, about 26% of the plants were killed and 35% of the fruit was affected.

Cracked fruit following fall rains developed to a severe extent in New Jersey.

SOLANUM TUBEROSUM, POTATO

Scab (Actinomyces scabies) was observed occasionally in New Jersey but was not severe. In Maryland it was practically absent on the late crop in the lower elevations of the eastern part of the State, but was very severe in western Maryland where some varieties averaged from 10 to 15% deep scab and 15 to 20% surface scab.

Early blight (Alternaria solani) was generally slight to moderate on the late crop throughout the area.

Bacterial ring rot (Corynebacterium sepedonicum) was observed on Katahdin potatoes in Garrett County in western Maryland at harvest, the first record for this part of the State. The disease was introduced with a carlot of "Select" northern seed that was distributed to over 400

victory gardeners. Tubers infected in the crop from this seed amounted to about 6%.

Rhizoctonia (Pellicularia filamentosa)(Corticium solani) caused severe black scurf on tubers in western Maryland. No aerial tubers were observed.

Late blight (Phytophthora infestans) was practically absent in most sections. In New Jersey tuber rot was observed in only one field, of the Chippewa variety. In western Maryland where rain was plentiful late blight reduced the crop in unsprayed fields about 25%.

Brown rot (Pseudomonas solanacearum) was observed to cause slight damage in a field of late potatoes in Caroline County, Maryland.

Leaf roll (virus) was serious in the late crop on the Eastern Shore of Maryland, with over 3% of the plants affected.

Drought affected the late crop in Delaware and Maryland, reducing stands about 30%.

CEREALS, GRASSES, AND FORAGE CROPS

FAGOPYRUM ESCULENTUM, BUCKWHEAT. A stem rot of undetermined origin was killing about 1% of the plants in a field near Seaford, Delaware.

MEDICAGO SATIVA, ALFALFA. Leaf spots (Pseudopeziza medicaginis and Pyrenopeziza medicaginis) caused severe defoliation of the uncut or seed crop in New Jersey late in the season. New growth showed only slight leaf spotting with no apparent loss. In Delaware leaf spots caused considerable defoliation of the lower leaves after the second cutting.

SOJA MAX, SOYBEAN. Frog-eye (Cercospora sojina) (C. daizu) was observed to a limited extent in Delaware. In Maryland slight infection was noted in 2 fields visited. Bacterial spot (Pseudomonas glycinea) and bacterial pustule (Xanthomonas phaseoli var. sojense) caused about 2% loss in Delaware and were observed frequently in Maryland.

Drought was severe in both Delaware and Maryland, reducing the crop 30 to 35%.

SORGHUM VULGARE var. SUDANENSE, SUDAN GRASS. Leaf blight (Helminthosporium turcicum) was very severe in all fields examined throughout the area, drying up the leaves and rendering the crop useless for silage or hay.

TRIFOLIUM spp., CLOVER. Powdery mildew (Erysiphe polygoni) was very pronounced by late summer.

ZEA MAYS, CORN. Ear rots caused by Diplodia zeae and Fusarium moniliforme were less common than usual. Loss from Diplodia was about 1.2% in Delaware and Maryland and did not exceed 2% in New Jersey; loss due to Fusarium was about 1%.

Stalk and root rot caused by Diplodia zeae was severe in St.Mary's County, Maryland, where losses averaged about 5%.

Leaf blight (Helminthosporium turcicum)was of minor importance. It was observed only in northwestern New Jersey, very late in the season, and in northeastern Maryland.

Smut (Ustilago maydis) (U. zeae) infection amounted to less than 1% throughout the area. Ear infection was practically absent in Delaware and New Jersey.

Drought, in Maryland, reduced the yield about 30%.

ZEA MAYS, SWEET CORN. Ear infection by smut (Ustilago maydis) in Delaware appears to be increasing. The crop from some fields showed 20% or more affected ears when received at the canning factories.

FRUIT CROPS

AMYGDALUS PERSICA, PEACH

Scab (Cladosporium carpophilum) was seldom observed in well-sprayed orchards, but was severe in some poorly managed plantings. Over 50% infection of the fruit, severe shot-hole with defoliation, and some twig infection were noted in some Maryland orchards. The variety Lizzie was severely affected in one New Jersey orchard, evidently not well-sprayed.

Brown rot (Monilinia fructicola) caused but slight loss in Maryland and was practically absent in Delaware and New Jersey. The variety J. H. Hale showed most infection in Maryland, and orchards with heavy infestations of the oriental peach moth were also most heavily attacked by brown rot. One block of J. H. Hale near Dover, Delaware showed a loss of 2 to 4%.

Constriction disease (Phoma persicae) was observed in several young and old orchards in Maryland, manifested by a yellowing of leaves on the affected branches. The results from severe stem infection occurring during the 1941 season are becoming pronounced.

Bacterial spot (Xanthomonas pruni) was the most destructive disease of peach observed in New Jersey. The varieties Elberta, Goldeneast, Halehaven, J. H. Hale, and Summercrest showed most severely affected fruits, while none or only slight infection occurred on Golden Jubilee and Belle. The disease was severe in 3 far-separated orchards in Maryland. Varieties showing the greatest fruit injury were Brackett, Champion, Early Elberta, Elberta, Goldeneast, Goldenglobe, Halehaven, J. H. Hale, Late Elberta, Redskin, Rio Oso Gem, Summercrest, Roberta, Sunhigh, and White Hale. Near Dover, Delaware, bacterial spot was severe on fruits of J. H. Hale, Elberta, and Shippers Late.

Little peach (virus) was observed in scattered orchards in New Jersey, to the extent of about 1%.

Spray injury in the form of marginal leaf burning was very pronounced in most orchards in Delaware; this type of injury may also have been associated with drought injury. Severe spray burn was noted in one Maryland orchard where summer oil used on apples drifted across the peach block. In this State also, especially severe arsenical injury was noted on Salwey and Krummell in one instance, where 5% of the fruit was damaged and 60% of the leaves were lost.

Freezing of the fruit buds by spring frosts was responsible for about 65% reduction in the crop in Delware, and 75% reduction in Maryland. On the Eastern Shore and in southern Maryland frost caused 90% reduction in the crop; in the mountain areas of western Maryland, on the other hand, the crop was about 80% of normal.

Crotch splitting due to winter injury was observed on 50% of the trees of the Raritan Rose variety in one New Jersey orchard.

JUGLANS REGIA, PERSIAN WALNUT

Leaf spot (Marssonia juglandis) was causing premature leaf drop on one tree in the Barnsboro section of New Jersey.

MALUS SYLVESTRIS, APPLE

Fire blight (Erwinia amylovora) was not active during the summer or ... fall. Jonathan and Wealthy showed some injury in Maryland.

Bitter rot (Glomerella cingulata) was of very slight importance throughout the area. In New Jersey it was observed mostly on Grimes Golden and Golden Delicious fruits. In Delaware it was practically absent in orchards visited except in one block of the Stark variety near Cheswold in which about 10% of the fruit was affected. In scattered orchards in Maryland, Grimes Golden showed 10% fruit infection, Maiden Blush 2%, Winter Banana a trace, Nero 2%, and Black Twig a trace.

Cedar rust (Gymnosporangium juniperi-virginianae) was severe on leaves of Rome Beauty in New Jersey. In Maryland it was more prevalent on the leaves than usual, but the fruit remained comparatively clean; on York Imperial 50% infection of the leaves was often observed whereas Jonathan showed only 1% infection. Mostly slight leaf infection was noted on Rome Beauty although in one orchard 30% was observed.

Black pox (Helminthosporium papulosum) was severe on Rome Beauty fruit from trees showing twig symptoms of measles in Maryland, while Coniothyrium fuckelii was isolated from such affected twigs.

Fruit spot (Mycosphaerella pomi) was observed in one orchard in northeastern Maryland.

Black rot (Physalospora obtusa) leaf infection (frog-eye) was more common than usual in Maryland. It appeared most frequently on York Imperial; 40% of the leaves of this variety were affected in one orchard. Yellow Transparent, Northwestern Greening, and Winter Banana were lightly affected. One block of Nero showed 2% loss from fruit rot.

Scab (Venturia inaequalis) was practically absent or very light on the fruit in most of the area. Early season leaf infection was also light, but a considerable amount developed on leaves late in the season, particularly on Delicious, Grimes Golden, Rome Beauty, Stayman Winesap, and York Imperial. In eastern New Jersey moderately severe infection was observed on McIntosh and Stayman Winesap, and to some extent on Delicious, fruit.

Drought injury was severe and resulted in small fruit that dropped off early.

Late blossoming was observed August 25 in a neglected orchard near Cheswold, Delaware. Leaves were few and there was no fruit on the trees.

Spray injury resulted in considerable leaf marginal burning in several orchards in Maryland. Some fruit injury was observed on Gano and York Imperial in two orchards.

RUBUS SP., RASPBERRY

In raspberry plantings observed in Maryland, spur blight (Didymella applanata) was generally distributed; about 10% of the canes were affected by anthracnose (Elsinoë veneta); a slight amount of cane blight (Leptosphaeria coniothyrium) occurred in commercial plantings; verticillium wilt (Verticillium albo-atrum) was responsible for most of the dead canes.

SPECIAL CROPS

NICOTIANA TABACUM, TOBACCO

In Maryland granville wilt (Pseudomonas solanacearum) was observed in 2 fields, one of Maryland Medium Broadleaf, and the other of Burley type. Losses amounted to 25-30% of plants killed. Mosaic (virus) was more severe than usual; average number of plants affected was about 20%. Ringspot (virus) was light, resulting in about 1.5% plants affected. Drought injury (weather) reduced the total crop 40%.

PLANT DISEASES IN OHIO DURING 1943

M. R. Harris

During the 1943 growing season, Ohio weather was somewhat abnormal. The spring was late. Precipitation was higher than normal which resulted in soil too wet to cultivate until as much as several weeks after the usual planting dates. In the middle and latter part of the growing season there was a scarcity of rainfall in the central and southern portions of the State resulting in some crops, such as corn and soybeans, ripening somewhat prematurely. However, the lack of rainfall late in the season made possible the harvesting of relatively disease-free corn and soybean crops.

VEGETABLE DISEASES

ALLIUM CEPA, ONION

Onions were damaged by hot wet weather which resulted in a scald of the bulb tops. Later, soft rot bacteria completed the breakdown. Pink root caused some loss where the fungus (Phoma terrestris) was present in the soil. Smut (Urocystis cepulae) was largely controlled by proper treatments at planting time.

APIUM GRAVEOLENS, CELERY. Early blight (Cercospora apii) of celery was not serious but late blight (Septoria apii) caused some injury where fields were not properly sprayed. Yellows (Fusarium oxysporum f. apii) was not an economic factor in celery production this year due largely to the planting of resistant varieties.

ASPARAGUS OFFICINALIS, ASPARAGUS. In some plantings, rust (Puccinia asparagi) is becoming a serious problem. Among growers, the opinion seems to be that resistant plants are gradually becoming susceptible.

BRASSICA OLERACEA var. CAPITATA, CABBAGE. The yellows disease (Fusarium oxysporum f. conglutinans) of cabbage was not damaging, owing largely to the planting of resistant varieties. Blackrot (Xanthomonas campestris) was quite a factor in some fields and caused a 4% loss over the entire State. Club root (Plasmodiophora brassicae) persists in a few places and caused a 0.5% loss in cabbage growing areas.

CUCUMIS MELO, CANTALOUP. Cantaloups were attacked by the anthracnose organism (Colletotrichum lagenarium) much less than last year. Bacterial wilt (Erwinia tracheiphila) was much more prevalent than last year and caused a 5% loss. Fusarium wilt (Fusarium sp.) was no more severe than

in an average year, causing a trace of damage. Leaf spot (Alternaria cucumerina) and mosaic caused only a trace of loss.

CUCUMIS SATIVUS, CUCUMBER. Anthracnose (Colletotrichum lagenarium) caused a 1% loss on cucumbers. Bacterial wilt (Erwinia tracheiphila) was more severe, causing a 3% loss. There was a trace of angular leaf spot (Pseudomonas lachrymans) in a few fields. Mosaic is becoming quite severe on some varieties of cucumbers, reducing the pick by more than half. Over the State this disease caused a 4% loss.

DAUCUS CAROTA, CARROT. Leaf blight (Cercospora carotae and Alternaria carotae) of carrots was no more severe than usual and caused a 6% reduction of the crop.

LYCOPERSICON ESCULENTUM, TOMATO. Tomatoes were attacked by early blight (Alternaria solani) early in the season during weather favorable to the disease. Losses up to 90% were seen in some fields, but over the entire season only 1% loss was sustained. Leaf mold (Cladosporium fulvum) while quite general in its distribution caused only 0.5% damage to the crop. Anthracnose fruit spot (Colletotrichum phomoides) was severe in spots and destroyed 7% of the State crop. A trace of wilt (Fusarium oxysporum f. lycopersici) was noted. Blossom-end rot was not very prevalent this past season. In some greenhouses it is a serious problem. Bacterial canker (Corynebacterium michiganense) was most often found on plants brought in from southern states which were delayed in being planted. There was a 1% loss from this disease. Leaf spot (Septoria lycopersici) was a factor in tomato production only locally where it caused a reduction in yield up to 75% in a few fields. The lateness of the season was not favorable to the development of leaf blight. There was a trace of wilt (Verticillium sp.) but the cool summer reduced the amount of this trouble. There was a 1% loss from virus diseases over the State but individual fields ran as high as 100%.

PHASEOLUS VULGARIS, BEAN. The bean crop was reduced 2% by anthracnose (Colletotrichum lindemuthianum). Powdery mildew (Erysiphe polygoni) did little damage generally but isolated fields in the northern part of the State were severely damaged late in the season. Bacterial blight (Xanthomonas phaseoli and/or Corynebacterium flaccumfaciens) caused a 0.5% reduction in the crop and was favored by wet weather early in the season.

PISUM SATIVUM, PEA. The pea crop was reduced 5% by seed decay and root rot caused by Fusarium sp. and favored by wet soil early in the season.

SOLANUM MELONGENA, EGGPLANT. Eggplant fields were severely damaged by wilt (Verticillium sp.) and over the State generally there was a 10% loss.

SOLANUM TUBEROSUM, POTATO. Potatoes were damaged to a moderate degree by scab (Actinomyces scabies) and there was a 1% loss. Early blight (Alternaria solani) was more prevalent than usual this past year and reduced the crop by 2.5%. In three fields of the State bacterial ring rot (Corynebacterium sepedonicum) was known to occur. The source of the disease was infected seed. On muck areas scurf and stem rot (Pellicularia filamentosa) (Corticium solani) did a slight amount of damage. Here and there a trace of blackleg (Erwinia phytophthora) was found. Wilt (Fusarium spp.) was about as prevalent as usual and the loss was 0.5%. Late blight early in the season promised to be serious but weather unfavorable to its development later in the season reduced the loss to a trace. The

fungus (Phytophthora infestans) was found near Columbus late in July. The virus diseases exclusive of leaf roll reduced the crop by 1%. Leaf roll was more severe and caused a 4% loss. Insect injury due to leaf hoppers was more severe than usual and was estimated at 8%.

CEREAL DISEASES

AVENA SATIVA, OATS. On oats there was a trace of leaf blotch (Helminthosporium avanae) this past season. A trace of halo blight (Pseudomonas coronafaciens) was found in the northwestern part of the State. Leaf rust (Puccinia coronata) was general and reduced the crop by 1%. Traces of stem rust (Puccinia graminis var. avenae) were found in widely scattered localities. Loose smut (Ustilago avenae) was general and caused a 0.5% loss while covered smut (Ustilago kolleri) was more severe and reduced the yield by 1.0%.

HORDEUM VULGARE, BARLEY. On barley a trace of ergot (Claviceps purpurea) was found. In four fields a trace of mildew (Erysiphe graminis) occurred. In the southern part of the State scab (Gibberella zeae) was observed in 4 fields and in one it had damaged the heads severely. A few traces of blotch (Helminthosporium spp.) were seen. Leaf rust (Puccinia anomala) was fairly prevalent but caused no loss. Stem rust (Puccinia graminis) likewise was scattered but not severe. Loose smut (Ustilago nuda) reduced the crop by 1.0% and covered smut (Ustilago jensenii) by 2%.

SECALE CEREALE, RYE. Ergot (Claviceps purpurea) on rye was severe in spots causing as high as 25% loss in isolated fields but over the State generally reduced the crop by 1%. Scab (Gibberella zeae) in one field infected 30% of the heads but averaged only a trace for the State. Traces of leaf rust (Puccinia rubigo-vera var. secalis) and stem rust (Puccinia graminis) were seen. In one field a trace of stem smut (Urocystis occulta) was present.

TRITICUM AESTIVUM, WHEAT. A trace of anthracnose (Colletotrichum graminicolum) was seen in Ashland County. One field showed traces of powdery mildew (Erysiphe graminis tritici). Scab infection was general and frequently severe. Percentage of heads infected with the fungus (Gibberella zeae) ran as high as 85 in some fields and for the State generally the loss was 12%. Stem rust (Puccinia graminis) was of general distribution and caused a 2% loss while leaf rust (Puccinia rubigo-vera var. tritici) was less severe and reduced the crop by 1%. A trace of glume blotch (Septoria nodorum) was found in four fields. There were traces of bunt (Tilletia levis) fairly common over the State but loose smut (Ustilago tritici) was much more general but not an economic factor.

ZEA MAYS, CORN. The corn crop was generally fairly free of disease. Ear rot (Diplodia, Gibberella and other fungi) was most common in the northern part of the State and reduced the crop by 0.8%. There was a trace of stalk rot caused by these same organisms. In the south half of the State, leaf blight (Helminthosporium turcicum) was quite prevalent but developed late in the season and caused only 1% loss. There was a trace of Stewart's wilt disease (Bacterium stewartii) in field corn but sweet corn showed an average loss of 3%. Smut (Ustilago maydis) reduced

the field corn crop by 0.6% and sweet corn by 2%.

FIELD CROP DISEASES

BETA VULGARIS, SUGAR BEET. On sugar beets, leaf spot (Cercospora beticola) caused a 2% loss which would have been much heavier if resistant varieties had not been planted. Many fields were lost in the seedling stage because of various fungi causing a black root condition aided by wet weather.

MEDICAGO SATIVA, ALFALFA. Alfalfa is grown in the western and northern parts of the State. The wilt and root rot disease (Corynebacterium insidiosum) is severe in many fields and reduces the crop annually by 5%. Leaf spot (Pseudopeziza medicaginis) is present in every field but does very little damage.

NICOTIANA TABACUM, TOBACCO. Tobacco is a minor crop in Ohio. In one field a trace of angular leaf spot (Pseudomonas angulata) was seen. Black root rot (Thielaviopsis basicola) reduced the crop by 4%. Traces of downy mildew (Peronospora tabacina) and wildfire (Pseudomonas tabaci) were present in a very few fields.

SOJA MAX, SOYBEAN. Soybeans were planted late over much of the State but due to very favorable weather late in the season matured a normal crop. Frog-eye spot was common over the State but severe in only a few fields. It reduced the crop by 0.5%. There was a trace of pod and stem blight (Diaporthe sojae). Anthracnose (Glomerella glycines) cut the yield by 0.1%. Mildew (Peronospora manshurica) at one time in the season appeared to be on the verge of a severe outbreak but finally damaged the crop by only 1%. Various virus and mosaic diseases were widely scattered. "Bud blight" was the most severe. The loss from all viruses is estimated at 1%. Bacterial pustule (Xanthomonas phaseoli var. sojense) was present in every field examined but seldom was serious and caused a loss for the State estimated at 2 %.

FRUIT DISEASES

AMYGALUS PERSICA, PEACH. On peaches, there was a trace of scab (Cladosporium carpophilum) which is less than in an average year. There was at least a 2% loss from brown rot (Monilinia fructicola) in the orchard and probably much more by the time the fruit was used. Bacterial blight (Xanthomonas pruni), leaf curl (Taphrina deformans), canker (Valsa leucostoma), and virus diseases (little peach and yellows) were all present as traces but did no appreciable damage.

FRAGARIA SPP., STRAWBERRY. Strawberries were infected with leaf spot (Mycosphaerella fragariae) but no appreciable damage was done. In some plantings traces of red stele (Phytophthora fragariae) were observed. Root rots caused by various fungi favored by poor growing conditions killed 5% of the State's plants.

MALUS SYLVESTRIS, APPLE. On apples, there was very much less fire blight (Erwinia amylovora) than in an average year and no damage was done. Bitter rot (Glomerella cingulata) was much more prevalent in southern Ohio than in an average year. Damage was 0.5%. The usual trace of cedar rust (Gymnosporangium juniperi-virginianae) was present in a number of

commercial orchards. In southern Ohio, pox disease (Helminthosporium papulosum) was more prevalent than in an average year but no appreciable damage over the State generally was recorded. Here and there a trace of Brook's spot (Mycosphaerella pomi) could be found. Blotch (Phyllosticta solitaria) could be found where spraying was not done properly. There was an early severe leaf infection of black rot (Physalospora obtusa) in southern Ohio which resulted in statewide damage of 0.3%. Scab (Venturia inaequalis) was severe and favored by weather conditions early in the season. The total loss for the State was 10%.

PRUNUS SPP., CHERRY. Cherry leaf spot (Coccomyces hiemalis) was more severe than usual during the past season and defoliated trees which were not sprayed. In some commercial orchards weather conditions prevented spraying at the proper time and in such orchards some defoliation resulted. The loss over the State was estimated at 1%. There was a trace of brown rot (Monilinia fructicola) when the fruit was ripening.

PRUNUS SPP., PLUM. On plums there was a trace of bacterial spot (Xanthomonas pruni). Brown rot, with the aid of insect damage, was severe and destroyed 12% of the crop.

PYRUS COMMUNIS, PEAR. On pears, traces of black spot (Fabraea maculata), fire blight (Erwinia amylovora), and scab (Venturia pyrina) were observed. Fire blight was less common than other years while black spot was seen more often.

RUBUS SPP., RASPBERRY. Raspberry cane blight (Leptosphaeria coniothyrium) was more prevalent than in an average year but did no appreciable damage. About 2% of nursery plants were found infected with crown gall (Agrobacterium tumefaciens). Anthracnose (Elsinoë veneta) took a heavy toll in some plantings and damaged the whole State to the amount of 8%. Virus diseases were found on 0.5% of the plants observed.

VITIS SPP., GRAPE. On grapes, the black rot fungus (Guignardia bidwellii) was very destructive and in many home vineyards which were not sprayed the crop was a total loss. Commercial vineyards that received 2 or more regular sprays were fairly free from the trouble. The State loss was 10%. A trace of both downy mildew (Plasmopara viticola) and powdery mildew (Uncinula necator) were seen but did no appreciable damage.

PLANT DISEASES AND RESULTING CROP LOSSES IN INDIANA, 1943

R. C. Baines

This report was prepared in collaboration with R. M. Caldwell, C. T. Gregory, and R. W. Samson of the Purdue University Agricultural Experiment Station and Arnold J. Ullstrup, of the Division of Cereal Crops and Diseases, U. S. Bureau of Plant Industry, Soils, and Agricultural Engineering. Specific recognition for the information presented is made by name under each disease.

PROBABLE INFLUENCE OF RAIN ON THE DEVELOPMENT OF DISEASES ON CROPS IN INDIANA DURING 1943

The rainfall during May in central and northern Indiana was approximate-

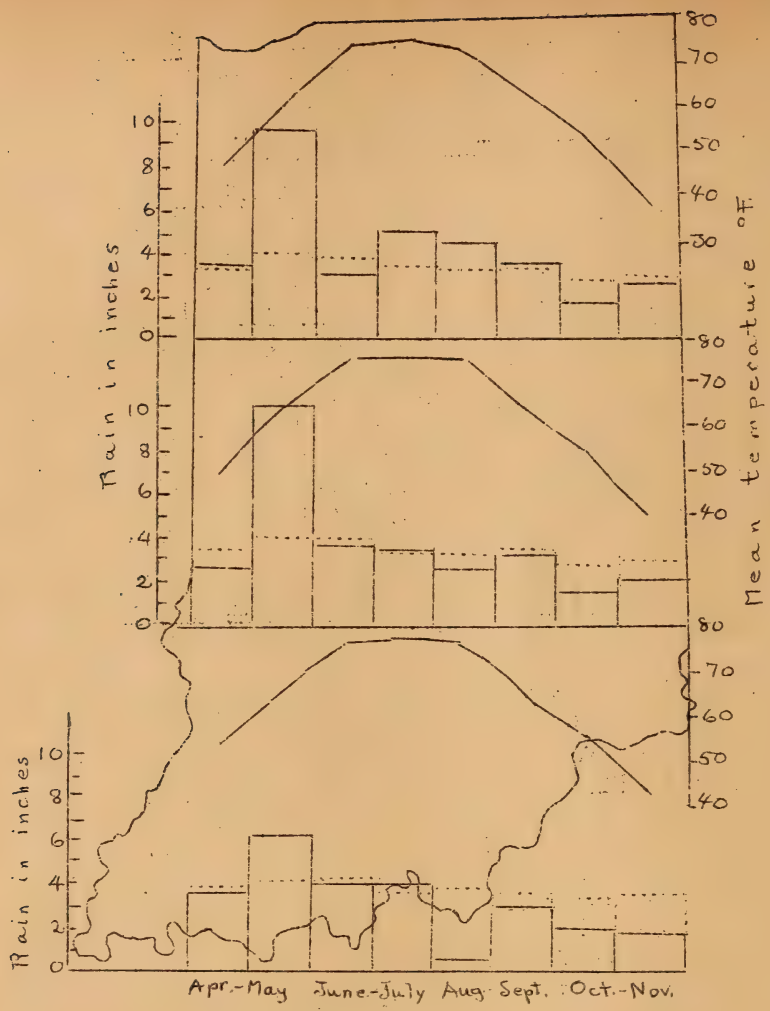

Figure 1.

Inches of rain and mean temperature in northern, central, and southern Indiana during the months of April to November, 1943.

Legend:

= actual rainfall

= average (56 years) rainfall

ly 2-1/2 times the average amount (see Figure 1). From June to September, inclusive, the rainfall in central Indiana departed only slightly from the average, while in northern Indiana it was slightly more than the average amount. The rainfall was considerably below the average during October in northern Indiana and during October and November in central Indiana.

In southern Indiana the rainfall during May was 1-1/2 times the average amount and in June and July approximately the average precipitation occurred. However, during the remainder of the summer and in the fall the rainfall in this area was much below normal.

With the abundant rainfall during May conditions apparently were exceptionally favorable for the development of wheat scab (Gibberella zeae) and apple scab (Venturia inaequalis).

The normal and above-normal rainfall from June through September in central and northern Indiana was favorable for the development of pustule spot (Xanthomonas phaseoli var. sojense) and downy mildew (Peronospora manshurica) of soybeans, late blight (Phytophthora infestans) of potatoes, leaf-spot (Septoria lycopersici) of tomato, leaf-spot (Cercospora zebrina) of red clover, cherry leaf-spot (Coccomyces hiemalis), leaf-blight (Helminthosporium turcicum) of corn, apple scab, etc.

In southern Indiana the rains were somewhat spotted during the summer and certain areas, especially the southwest corner, were very dry. The leaf-spot diseases and some fruit-rots, such as bitter-rot of apple, were not very prevalent nor severe in southern Indiana.

The below-average rainfall during October and November in Indiana appeared to check the spread of most diseases. Thus, very few potato tubers were infected with late blight, even in fields in which the foliage was blighted severely, and the percentage of corn ears that were infected with Diplodia zeae was below normal.

DISEASES OF VEGETABLES

ALLIUM CEPA, ONION

Erwinia carotovora (soft rot) was common on dried onions. In home gardens considerable rot was evident at harvest, especially on white Bermuda onions, and losses ranged from 10 to 60%. A trace of soft rot was found in commercial fields of yellow onions on muck soils in northern Indiana. Losses ranged from 2 to 4% in topped and cured onions according to R. C. Baines.

Phoma terrestris (pink root rot). Onions on soil on which a number of crops of onions had been grown in the past usually were affected slightly to severely with pink root rot. No attempt was made to interpret the degree of infection as reduction in yield, although it is assumed that severe infection and killing of the roots must affect detrimentally the size of the bulbs. -- R. C. Baines

Urocystis cepulae (smut). A trace occurred on young onions. This disease apparently is controlled satisfactorily by seed treatments according to C. T. Gregory.

APIUM GRAVEOLENS, CELERY

Cercospora apii (early blight) occurred generally on celery and caused severe injury in northern Indiana. The estimated loss was 20%. A trace of celery affected with Fusarium oxysporum f. apii (Fusarium yellows) was observed. Varieties resistant to the disease are usually grown. Septoria sp. (late blight) caused a trace of infection and loss. -- C. T. Gregory.

BETA VULGARIS, BEET

Actinomyces scabies (scab) caused 5% loss in marketable beets in one field in northern Indiana according to R. W. Samson. The loss for the State is placed at a trace.

Cercospora beticola (leaf spot) occurred on practically all beets and very likely caused 2 to 5% loss in yield. -- R. C. Baines and C. T. Gregory.

BRASSICA OLERACEA var. ACEPHALA, KALE

Fusarium oxysporum f. conglutinans (yellows). Between 5 and 20% of the plants in market garden plantings were affected with yellows, which resulted in approximately 10% loss for the State. -- C. T. Gregory

BRASSICA OLERACEA var. CAPITATA, CABBAGE

Erwinia carotovora (bacterial soft rot) caused a head rot in the field in early summer in northern Indiana. The prevalence and severity of this disease appeared to be due to the frequent heavy rain (see rainfall map, figure 1). The loss is estimated at 5% by C. T. Gregory and R. C. Baines.

Fusarium oxysporum f. conglutinans (yellows). Between a trace and 5% of yellows-affected plants occur in most fields. Resistant varieties are usually grown. The average loss is estimated to be 2% by C. T. Gregory and R. C. Baines.

Plasmodiophora brassicae (clubroot). In 2 fields in northern Indiana approximately 75% of the plants were infected, resulting in 50% loss. The estimated loss for the State was a trace. -- C. T. Gregory and R. C. Baines.

Xanthomonas campestris (black rot). A trace occurred in a few of the fields observed by R. C. Baines and C. T. Gregory.

BRASSICA PEKINENSIS, CHINESE CABBAGE

Xanthomonas campestris (black rot). In a half-acre planting near Indianapolis 15% of the plants were infected severely. The average loss from this disease for the State is about 1%. -- C. T. Gregory.

CAPSICUM FRUTESCENS, PEPPER

Xanthomonas vesicatoria (bacterial spot). In a few fields this disease reduced the foliage by 5%. The average loss in yield (including fruit infection) was about 0.5%.

Mosaic (virus). In a few plantings 50% of the plants were infected, and the average loss in yield in the State is estimated at 5%.

Sun scald (non-parasitic). The loss of fruit from sun scald is estimated at 10%. -- C. T. Gregory and R. C. Baines.

CICHORIUM ENDIVIA, ENDIVE

Aster yellows (virus) occurs in nearly all plantings and the loss is estimated at 5%. -- C. T. Gregory.

CITRULLUS VULGARIS, WATERMELON

Alternaria cucumerina (leaf blight) occurred in most plantings and caused slight defoliation and 0.2% (estimated) reduction in yield. -- R. C. Baines and C. T. Gregory.

Colletotrichum lagenarium (anthracnose). Slight to moderate infection of the leaves occurred in most plantings. Severe infection of the fruit occurred late in the fall in northern Indiana. The average estimated loss from anthracnose was 0.5%. -- R. C. Baines.

Fusarium oxysporum f. melonis (wilt). A trace occurred in occasional plantings of susceptible varieties. -- R. C. Baines and C. T. Gregory.

Pythium spp. (blossom-end rot) occurred in all of the fields examined and the estimated average loss was 5%.

CUCUMIS MELO, CANTALOUP

Alternaria cucumerina (leaf blight) occurred rather generally over the State and caused about 1% loss.

Colletotrichum lagenarium (anthracnose). Slight to moderate infection occurred on the leaves in central and northern Indiana. In southern Indiana the rainfall was deficient during the summer and practically no anthracnose was found in that area. It is estimated that anthracnose caused 0.2% loss for the State.

Erwinia tracheiphila (bacterial wilt) was of general occurrence in the State and caused an estimated 5% loss.

Fusarium oxysporum f. melonis (Fusarium wilt). In a few fields in southwestern Indiana between 10 and 15% of the plants were infected severely. The average loss for the State was estimated to be 0.1%. -- R. C. Baines and C. T. Gregory.

CUCUMIS SATIVUS, CUCUMBER

Erwinia tracheiphila (bacterial wilt) was of general occurrence in the State. The percentage of plants infected in the different fields ranged from 5 to 50, and the average estimated loss was 10%. -- R. C. Baines and C. T. Gregory.

Heterodera marioni (rootknot). In occasional greenhouses nematodes caused approximately 20% loss. The estimated loss in yield for the State was 0.1%. -- C. T. Gregory.

DAUCUS CARCTA, CARROT

Alternaria carotae (leaf blight) was of general prevalence and caused an estimated reduction in yield of 5%. -- R. C. Baines and C. T. Gregory.

IPOMOEA BATATAS, SWEETPOTATO

Actinomyces sp. (soil rot) occurred in 20% of the sweetpotato fields in Indiana. In 15% of the fields only a trace was noted; however, in 5% of the fields approximately 21% of the fleshy roots were infected slightly to moderately. Soil rot caused approximately 0.2% loss in yield and quality in Indiana.

Ceratostomella. See Endoconidiophora.

Diaporthe batatatis (dry rot) was found in storage houses on an occasional root. This disease caused no appreciable loss in Indiana.

Endoconidiophora fimbriata (Ceratostomella fimbriata) (black rot). A trace of black rot was found in 10% of the fields at harvest, but none was seen on roots examined in storage during the winter. The loss in yield in Indiana from black rot was a trace.

Fusarium oxysporum f. batatas. Stem rot or wilt was the most serious and widespread disease of sweetpotatoes in southern Indiana in 1943. It occurred in 90% of the fields examined, and from a trace to 33% of the plants were infected severely and killed or badly stunted, while the yield from moderately infected plants was reduced about 25%. The average reduction in yield due to wilt in the State was about 10%.

Some sweetpotatoes affected with fusarium surface rot were found in all lots examined in storage houses during December, totaling about 0.5% of the roots in storage. In occasional lots about 3% of the sweetpotatoes were discarded because of surface rot.

Pythium ultimum (mottle-necrosis and ring rot). A trace of mottle necrosis occurred on Yellow Jersey sweetpotatoes in 10% of the fields. In storage only a trace of ring rot was observed.

Rhizopus nigricans (soft rot). In one lot of sweetpotatoes stored in tight, poorly ventilated baskets approximately 3% of the roots were infected. The average was about 0.5% of the sweetpotatoes in storage infected.

Sclerotium bataticola (charcoal rot). Occasional roots infected with this fungus were found in storage. -- R. C. Baines

LACTUCA SATIVA, LETTUCE

Botrytis cinerea (gray mold). A trace was found on the first planting in a few greenhouses. In subsequent plantings from a trace to 5% (average 0.5%) loss occurred in all of the greenhouses. -- C. T. Gregory and R. C. Baines.

Sclerotinia sclerotiorum (drop). In occasional greenhouses a few infected plants were observed during December. -- R. C. Baines and C. T. Gregory.

Brown blight ? (virus disease). Lettuce in 2 greenhouses at Indianapolis and in 1 at Evansville showed from a trace to 3% infection with a transmissible virus disease (R. W. Samson, PDR 28(6): 203, Mar. 15, 1944) that produces symptoms somewhat similar to the brown blight disease described by I. C. Jagger (Phytopath. 30: 53-64, 1940). The affected plants usually were not marketable. -- R. C. Baines, C. T. Gregory, and R. W. Samson.

Aster yellows (virus). An occasional infected plant was found in a greenhouse near Evansville. -- R. C. Baines

Mosaic (virus). Usually from 1 to 5% of the plants in greenhouses are infected with mosaic. However, the value of the infected plants was not lowered and the disease apparently caused no loss. -- C. T. Gregory and R. C. Baines.

LYCOPERSICON ESCULENTUM, TOMATO

Alternaria solani (stem canker and early blight). Stem cankers on recently transplanted tomatoes caused approximately 2% reduction in stand and yield. Frequent rains during May and June in Indiana delayed planting and favored the development of this disease on the young plants. The delayed planting in Indiana necessitated, in many cases, the growing of the seedling for a longer time in the plant fields in the southern States under crowded plant conditions, which are usually favorable for the development of collar rot or stem cankers.

During the growing season early blight caused appreciable defoliation in many fields and reduced the yield for the State about 3%. -- R. W. Samson and R. C. Baines.

Cladosporium fulvum (leaf mold) occurred in traces in about half of the greenhouses in Indiana. -- C. T. Gregory.

Colletotrichum phomoides (anthracnose). During August and September anthracnose of ripe, field-grown fruit was particularly abundant in central and northern Indiana. The loss of fruit and the reduction in quality of the fruit produced amounted to about 2% for the State. -- R. W. Samson and R. C. Baines.

Corynebacterium michiganense (bacterial canker) occurred in traces in a few fields. The almost exclusive use of certified seed for the production of plants for the commercial canning acreage has greatly reduced the prevalence of this seed-borne disease. -- R. W. Samson and R. C. Baines.

Fusarium oxysporum f. lycopersici (fusarium wilt). In occasional fields from 30 to 40% of the plants were affected with wilt. The average loss in yield caused by this disease in field-grown tomatoes in Indiana is estimated at 2%.

In greenhouses fusarium wilt resulted in losses up to 25% with an estimated average loss of 1%. -- C. T. Gregory and R. C. Baines.

Phytophthora parasitica (buckeye rot). A trace of fruit was affected by buckeye rot during 1943. In a few cases it caused from 30 to 40% loss of fruit in victory garden plantings. -- R. C. Baines and R. W. Samson.

Pseudomonas solanacearum (bacterial wilt) was particularly prevalent on late-planted transplants, which had been grown in the southern States (see Alternaria solani). The percentage of plants infected ranged from a trace to 60% and the average loss for the State was 0.5%. -- R. W. Samson.

Septoria lycopersici (leaf spot). A severe epiphytotic occurred generally in Indiana, except for the dry southwestern corner of the State. During August and September tomatoes were defoliated 50 to 90%, and it was estimated that the yield and value of the fruit in the State was reduced 20%. -- R. C. Baines and R. W. Samson.

Xanthomonas vesicatoria (bacterial spot). In central and northern Indiana the bacterial spot disease occurred on leaf-stems and fruit in approximately 1/3 of the fields. The estimated average loss in yield for the State was 1%. -- R. C. Baines and R. W. Samson.

Heterodera marioni (rootknot). A trace of rootknot occurred on tomatoes in a few fields. The transplants used in these fields had been

grown in the southern States. -- R. W. Samson.

In occasional greenhouses nematodes caused from 3 to 4% loss in yield. The estimated average loss of greenhouse-grown tomatoes was 0.1%. -- C. T. Gregory.

Aster yellows (virus). A trace of the tomato plants in a few fields were infected with what is thought to be aster yellows. -- R. W. Samson and R. C. Baines.

Mosaic (virus), in field-grown tomatoes caused an average loss of 0.5% in yield for the State. -- R. W. Samson and R. C. Baines.

Between 30% and 50% of the plants of the spring crop in most greenhouses in Indiana were infected with mosaic. The average estimated loss in yield was 5%. -- C. T. Gregory.

Single-virus streak (virus). In one greenhouse establishment near Terre Haute 80% of the early winter crop were infected severely with single-virus streak (caused by a strain of the tobacco mosaic virus) and the yield evidently was reduced from 10 to 15% in this house. -- R. C. Baines, C. T. Gregory, and R. W. Samson.

PHASEOLUS LUNATUS, LIMA BEAN

Xanthomonas phaseoli (bacterial blight) was prevalent on lima beans and frequently about 10% of the foliage was blighted. The reduction in yield was probably 3 to 4%. -- C. T. Gregory and R. C. Baines.

PHASEOLUS VULGARIS, GREEN BEANS

Fusarium solani f. phaseoli (root rot). In many garden plantings fusarium root rot caused a slight reduction in stand. The decrease in yield during 1943 was estimated to be 0.2%. -- C. T. Gregory and R. C. Baines.

Xanthomonas phaseoli (bacterial blight) caused severe loss in yield of an occasional garden planting; however, the average loss in yield was a trace. -- R. C. Baines and C. T. Gregory.

RAPHANUS SATIVUS, RADISH

Aphanomyces raphani (black root). Radishes in the vicinity of Lafayette frequently were affected severely. -- R. C. Baines.

Pellicularia filamentosa (Corticium vagum) (stem rot). In greenhouses near Indianapolis, radishes were infected slightly. -- C. T. Gregory.

SOLANUM MELONGENA, EGGPLANT

Verticillium albo-atrum (wilt). In a few plantings from 50 to 90% of the plants were infected. The loss for the State was estimated to be 1% of the yield. -- R. C. Baines and C. T. Gregory.

SOLANUM TUBEROSUM, POTATO

Actinomyces scabies (scab). Between 15 and 70% (average 33%) of the potatoes grown on muck soil were affected by scab and approximately 4% of the tubers were infected severely (culls). It is estimated that the reduction in grade and loss of marketable potatoes amounted to 6% of the of the value of the crop. -- R. C. Baines and R. W. Samson.

Alternaria solani (early blight) was prevalent during the summer in

most fields but did not result in appreciable infection and defoliation until fall. The yield was reduced about a trace. -- R. W. Samson and R. C. Baines.

Corticium. See Pellicularia.

Erwinia carotovora (bacterial soft rot) caused a trace of loss when the potatoes were graded soon after digging. -- R. W. Samson and R. C. Baines.

Pellicularia filamentosa (Corticium vagum) (stem rot) was favored by the cool wet weather following planting in the spring, and caused about 2% loss in stand. -- R. W. Samson.

Phytophthora infestans (late blight) was prevalent on the foliage in all late-maturing fields in northern Indiana. In a few fields the vines were blighted severely. However, the dry weather and soil during September appeared to be unfavorable for the infection of the tubers and the development of rot. In a few late fields from 1 to 8% of the tubers were rotted. The estimated average loss from late blight in Indiana was 0.2%. -- R. C. Baines and C. T. Gregory.

Viruses (all viruses but chiefly leaf roll and spindle tuber). From a trace to 1 to 2% of the plants were usually infected. The estimated average loss for the State was 0.2%. -- R. W. Samson.

DISEASES OF CEREALS, GRASSES, AND FORAGE CROPS

AVENA SATIVA, SPRING OATS

Spring oats in Indiana generally were infected severely with Puccinia coronata (crown rust), which reduced the yield about 10%. Pyrenophora avenae (Helminthosporium avenae) (leaf blotch) was of general occurrence in Indiana. Usually infection was slight. It was estimated that leaf blotch resulted in an average reduction in yield of 0.5%. Ustilago avenae (loose smut) and U. kolleri (covered smut) occurred in most fields to some extent, and usually about 0.5% of the panicles were smutted. It is estimated that the average reduction in yield was 0.5%. -- R. M. Caldwell.

HORDEUM VULGARE, WINTER BARLEY

Gibberella zeae (scab). Barley, which is grown chiefly in the southern half of Indiana, usually was infected slightly with G. zeae. The average estimated loss in yield from scab was 5%. -- R. M. Caldwell

Puccinia anomala (leaf rust). Barley was affected slightly with leaf rust, and the yield was reduced a trace as a result of this disease. -- R. M. Caldwell.

Puccinia graminis var. tritici (stem rust). A trace occurred on barley and no apparent loss in yield resulted from this disease. -- R. M. Caldwell.

Ustilago jensenii (covered smut). A trace of infection resulted in a trace reduction in yield. -- R. C. Baines.

Ustilago nigra and U. nuda (loose smut) generally occurred in moderate infections which reduced the yield approximately 2%. -- R. M. Caldwell.

MEDICAGO SATIVA, ALFALFA

Pseudomonas medicaginis (bacterial wilt). From 10 to 20% of the alfalfa plants in a number of fields in northwestern Indiana were infected and killed. The actual loss in hay was minimized by the cultural practice of interplanting the alfalfa with timothy or some other "hay" grass. -- M. O. Pence.

Pseudopeziza medicaginis (leaf spot) was abundant on the first cutting throughout the State and on the second cutting in northern Indiana. The estimated reduction in yield of the first cutting was 5 to 10%. -- R. C. Baines.

* (Secale cereale, see below).

SOJA MAX, SOYBEAN

Cercospora sojina (C. daizu) (frog-eye leaf spot) was prevalent in central and southcentral Indiana. In this area from 70 to 100% of the leaves in a quarter of the fields were infected severely and the yield was reduced about 10%. A trace was observed in northern Indiana. Southwestern Indiana was unusually dry and soybeans were nearly free from leaf spot diseases. The loss in yield from "frog-eye" for the State is estimated at a trace. -- R. C. Baines and C. T. Gregory.

Cercosporina kikuchii (purple spot of soybean seed). From 1 to 3% of the soybeans in occasional fields in central and northern Indiana were affected severely with the purple spot disease. There was no apparent crop loss. -- R. C. Baines.

Diaporthe sojae (pod and stem blight). Very little of this disease was observed in 1943. A trace was found in a few fields at harvest, but no significant loss resulted. -- R. C. Baines and C. T. Gregory.

Fusarium oxysporum f. tracheiphilum (wilt) was observed in 2 fields, and apparently this disease at present is not widespread in Indiana. In Shelby County 10% of the plants of the Manchu variety in a small variety planting were killed prematurely and about 0.5% of the plants in a 20-acre field in Hendricks County were killed. The loss for the State was a trace. -- C. T. Gregory and R. C. Baines.

Glomerella glycines (anthracnose). During September a trace developed, chiefly on the stems, in most fields, but the disease resulted in little or no damage as the plants were nearly mature at the time of its appearance. -- R. C. Baines and C. T. Gregory.

Peronospora manshurica (downy mildew) occurred in about 60% of the soybean fields examined. Infection was especially abundant in central and northern Indiana, and sparse in southwestern Indiana. In a few fields between 50 and 100% of the leaves were infected severely. Considerable etiolation of the infected leaf area occurred, but only slight necrosis. The reduction in yield from most fields was a trace; however, in occasional fields it appeared that the yield was reduced by 2 to 3% at least. -- R. C. Baines and C. T. Gregory.

Sclerotium bataticola (charcoal rot). A trace was found in one field in Sullivan County by C. T. Gregory.

Xanthomonas phaseoli var. sojense (bacterial pustule or blight). The bacterial pustule or blight disease was very prevalent on soybeans in central and northern Indiana, while in southwestern Indiana soybeans were free from or affected by only a trace of this disease. Approximately 5%

*SECALE CEREALE, RYE

A trace of Claviceps purpurea (ergot) occurred in 1943. Generally rye was infected slightly with Puccinia rubigo-vera var. secalis (leaf rust), and a trace resulted. -- R. M. Caldwell.

of the fields were nearly free from infection, 45% were affected slightly, 30% moderately, and 20% severely. In the fields classed as moderately affected from 40 to 90% of the leaves usually showed moderate infections, while in fields that were severely affected from 60 to 90% of the leaves showed severe infection.

This disease induced little or no defoliation of the varieties grown in Indiana, but caused considerable yellowing and necrosis of the infected leaf area. In the moderately affected fields the yield probably was reduced 1 to 5%, and in severely affected fields from 5 to 10%. Thus, the yield for the State was reduced 3 to 4% by this disease. -- R. C. Baines and C. T. Gregory.

Mosaic (virus). A trace of mosaic was found in occasional fields. -- R. C. Baines and R. W. Samson.

Streak or bud blight (virus). This disease is caused by the tobacco-ringspot virus or a virus that has somewhat similar properties. The disease causes the abscission of blossoms and young pods, the blasting of beans in the pod, brown blotches and streaks on the pod, mosaic symptoms on the young leaves, and usually dark streaks in the pith of the internodes. Plants infected when still young mature few or no beans.

R. W. Samson observed this disease on vegetable soybeans in Indiana in 1941. He determined that the disease was caused by the tobacco-ringspot virus (PDR 26(17): 382, Sept. 15, 1942). In 1942, Folke Johnson observed the disease on field soybeans in Ohio, and confirmed the identification of the causal virus (PDR 27(2):86-87, Feb. 1, 1943). During 1943, from a trace to 1% of the plants in many fields were infected with streak in Indiana. In occasional fields from 5 to 10% of the plants were infected. The yield from infected plants ranged from none at all to 60% of that from healthy plants, depending presumably on the stage of maturity of the plant at the time of infection.

At this time not very much is known regarding the sources of infection and the mode and rate of spread of the disease in soybean fields. The development of this disease should be followed closely in the future and, if necessary, measures taken to prevent any serious spread or increase. -- R. C. Baines and C. T. Gregory.

SORGHUM VULGARE var. SUDANENSE, SUDAN GRASS

Helminthosporium turcicum (leaf blight). Sudan grass was severely infected and it was estimated that the feed value was reduced 30 to 40%. -- R. C. Baines.

TRIFOLIUM PRATENSE, RED CLOVER

Cercospora zebrina (leaf spot). Red clover generally was infected moderately to severely with C. zebrina. The average reduction in yield and quality of hay was estimated at 10%. -- R. C. Baines.

TRITICUM AESTIVUM, WINTER WHEAT

Gibberella zeae (scab) occurred in epidemic severity on wheat in Indiana in 1943. Wheat in the southern half of the State was infected severely and in a few fields a 50% loss in yield resulted. In the northern half wheat was affected slightly to moderately and losses ranged from 1 to

21% (average 10%) of the grain. The average loss in yield and grade of wheat due to scab was estimated to be 17% for the State. -- R. M. Caldwell and R. C. Baines.

Puccinia graminis var. tritici (stem rust). A trace of infection and loss occurred in south-central Indiana. -- R. M. Caldwell.

Puccinia rubigo-vera var. tritici (leaf rust) was moderate and generally distributed over Indiana. The average loss in yield and quality was estimated to be 5% for the State. -- R. M. Caldwell.

Septoria nodorum (glume blotch). Slight infection occurred in local fields of wheat in southern Indiana. The loss was a trace. -- R. M. Caldwell.

Septoria tritici (speckled leaf blotch). Slight, fairly general infection occurred in Indiana in 1943. This disease was more prevalent than usual and caused a trace of loss. -- R. M. Caldwell.

Tilletia foetida (T. levis) (bunt). A slight amount of infection by bunt occurred in occasional fields; the resultant loss was a trace reduction in yield. -- R. M. Caldwell.

Ustilago tritici (loose smut) occurred generally over the State and caused an estimated average loss of 5% in yield. -- R. M. Caldwell.

A root rot of undetermined cause occurred in occasional fields and was serious especially in wet areas. The estimated loss was 1%. -- R. M. Caldwell.

A trace of wheat mosaic (virus) occurred in limited and local areas. -- R. M. Caldwell.

ZEA MAYS, CORN

Bacterium stewartii (bacterial leaf blight). Nearly all of the corn fields in Indiana were affected slightly or moderately with bacterial leaf blight. An occasional field was affected severely. It was estimated that losses ranged from a trace up to 1% in severely affected fields. -- R. C. Baines and A. J. Ullstrup.

Diplodia zeae (ear rot and stalk rot). Diplodia ear rot was less prevalent than normal. Between 1 and 3% of the ears in 16% of the fields were infected. The estimated loss in yield for the State from this rot was 0.2%.

Diplodia stalk rot was found in all of the fields examined and between 1 and 65% (average 27%) of the stalks were infected severely. This disease occurred late when the corn was dented well. In a few fields infection occurred when the grain was immature and caused a slight reduction in yield. -- R. C. Baines and A. J. Ullstrup.

Gibberella fujikuroi (fusarium ear rot) occurred in 84% of the fields. Between 1 and 9% (average 2.8%) of the ears were infected slightly. The loss in sound grain from this rot was estimated at a trace. -- R. C. Baines and A. J. Ullstrup.

Gibberella zeae (Gibberella ear rot) was more prevalent than average and was distributed generally over the State. From 1 to 4% of the ears in 40% of the fields were infected. Approximately 0.8% of all the ears were infected with G. zeae, which resulted in about 0.4% reduction in sound corn.

It appears likely that the increase in Gibberella ear rot over other

years was caused by the abundance of inoculum from scabby grain fields.-- R. C. Baines and A. J. Ullstrup.

Helminthosporium turcicum (leaf blight) was very severe on corn in the east-central area of Indiana, and this area of severe infection was larger than in 1942. Local fields in central and northern Indiana also were infected severely. Severely blighted leaves were killed prematurely and resulted in many chaffy ears; also, there was appreciable reduction in the quantity and quality of fodder. No accurate estimates of decreases in the yield of grain were obtained; however, it is believed that leaf blight in severely infected fields reduced the yield by 10%, and for the State 0.5% loss is probable. -- A. J. Ullstrup and R. C. Baines.

Hormodendron sp. (kernel rot). In occasional fields a black rot of individual grains, caused by Hormodendron sp., occurred. There was no appreciable loss in yield from this disease. -- R. C. Baines and A. J. Ullstrup.

Nigrospora sphaerica (cob rot) occurred in 12% of the fields examined and caused only a trace of reduction in yield for the State. -- R. C. Baines.

Penicillium spp. (ear rot). Penicillium rot nearly always followed earworm injury and caused a trace of loss in most fields. -- R. C. Baines.

Physalospora zeae Stout (leaf and stalk rot). Sparse lesions caused by P. zeae occurred on leaves and at the bases of the tassels in occasional fields in the southern half of Indiana. The imperfect stage, Macrophoma zeae Tehon & Daniels, was found associated with the perithecia of P. zeae. There was no appreciable loss from this disease. -- A. J. Ullstrup and R. C. Baines.

Physoderma zeae-maydis (brown spot). Corn in the Ohio drainage area was infected slightly to moderately with P. zeae-maydis, but there was no appreciable damage. -- A. J. Ullstrup and R. C. Baines.

Puccinia sorghi (rust). Occasional scattered fields throughout Indiana were infected slightly to moderately. No apparent loss in yield resulted. -- R. C. Baines.

Ustilago maydis (smut) was much less prevalent than normal and caused no appreciable loss. The maximum percentage of infected plants in a field was 3. -- R. C. Baines and A. J. Ullstrup.

Seedling blights (caused by Diplodia zeae, Fusaria, etc.), caused no important losses during 1943. Corn planting was delayed because of wet weather during May and the seed germinated and grew rapidly when planted.

Corn was injured severely by root worm in scattered areas of the State and the injured plants frequently were affected by an undetermined bacterial stalk rot. There appeared to be a close relationship between the insect injuries and the stalk rot. -- A. J. Ullstrup.

DISEASES OF FRUIT CROPS

AMYGDALUS PERSICA, PEACH. In southern Indiana an occasional fruit affected with brown-rot (Monilinia fructicola) was observed. The dry weather during July and August apparently was unfavorable for the development of this disease. A trace of leaf-curl (Taphrina deformans) occurred. In most orchards from slight to moderate bacterial spot (Xanthomonas pruni)

developed on the fruit and leaves and caused a trace of loss in the State. -- R. C. Baines.

FRAGARIA, STRAWBERRY. Mycosphaerella fragariae (leaf-spot). Strawberries in Indiana generally were infected slightly to moderately. Occasional commercial fields of strawberries were infected moderately with Phytophthora fragariae (red stele) and a number of home garden plantings were infected severely. Severely infected plants produced few or no strawberries. -- R. C. Baines.

MALUS SYLVESTRIS, APPLE. Glomerella cingulata (bitter-rot). During July and August a few apples affected with bitter rot were observed in a few orchards in southern Indiana. This disease did not increase during August and September, evidently because of unfavorable moisture conditions. The loss was a trace.

Gloeodes pomigena (sooty blotch). A trace to 1% of the apples were affected moderately with socty blotch in a few orchards in southern Indiana. There was no appreciable loss.

Gymnosporangium clavipes (G. germinale) (Schw.) Kern (quince rust). A trace of Delicious apples infected severely with quince rust were observed in a few orchards in southern Indiana.

Gymnosporangium juniperi-virginianae (apple rust). From a trace to 5% of the leaves and fruit were infected with the apple rust fungus in orchards in central and southern Indiana. The loss of fruit in the State from this disease was a trace.

Helminthosporium papulosum (black pox). In one orchard near Seymour, Indiana, Grimes Golden apples on a number of old trees were infected severely with Helminthosporium papulosum.

Phyllosticta solitaria (blotch). In a number of orchards in southern Indiana Dutchess apples were infected severely. The loss in grade and quality was estimated to have amounted to 3% of the value of the crop.

Physalospora obtusa (black-rot, frog-eye). On apples in Indiana frog-eye leaf-spot was of general occurrence. Infection ranged from a trace to slight and apparently caused a slight reduction in yield. A trace of fruit infected with P. obtusa was observed in all of the orchards examined.

Venturia inaequalis (scab). Scab infection of apples was more severe in 1943 than during the past 4 years. The climatological conditions during the spring were favorable for the epiphytotic development of this disease in many orchards. Fruit infected with scab ranged from a trace to 100%. The differences in the degree of scab infection in the orchards appears to be caused chiefly by differences in the amounts of primary ascosporic inoculum, and the timeliness and thoroughness that the applications of fungicides were made. It is estimated that scab caused a 10% loss of crop and a 10% loss in grade or value, total loss 20%. -- R. C. Baines.

PRUNUS AVIUM, SWEET CHERRY. Coccomyces hiemalis (leaf-spot). caused severe defoliation. -- R. C. Baines.

PRUNUS CERASUS, SOUR CHERRY. Coccomyces hiemalis (leaf-spot). Sour cherry trees were severely defoliated by C. hiemalis. -- R. C. Baines.

PRUNUS spp., PLUM. Plums in Greene and Lawrence Counties were infected severely with C. prunophorae (leaf spot) and defoliated moderately.

Xanthomonas pruni (bacterial spot) was severe on hybrid (European x Americana) plums near Lafayette. -- R. C. Baines.

RIBES SATIVUM, RED CURRANT. Mycosphaerella grossulariae (leaf spot): Currant leaves in Tippecanoe County were infected moderately with slight defoliation resulting. -- R. C. Baines.

RIBES UVA-CRISPA, GOOSEBERRY. Mycosphaerella grossulariae (leaf spot). Gooseberries in Tippecanoe County, Indiana, were defoliated severely and the yield and quality reduced possibly 10%. -- R. C. Baines.

RUBUS sp., RASPBERRY. Elsinoë veneta (anthracnose). During 1943, the new raspberry canes were infected severely with anthracnose. It is estimated that this disease caused a 5% loss in crop. -- R. C. Baines.

Sphaerulina rubi (leaf-spot). Raspberries in Indiana were infected severely with S. rubi and frequently were nearly defoliated in September. The crop is estimated to have been reduced 5 to 10% by this disease. -- R. C. Baines.

Non-parasitic, low winter temperature. During the winter of 1942-1943 raspberry canes were injured severely by low temperatures. In many cases the injured canes produced new leaves, blossomed, and then died before the berries matured. The injured canes frequently were infected by Leptosphaeria coniothyrium. The loss of crop was estimated at 30 to 50% (average 40%). -- R. C. Baines.

VITIS LABRUSCA, GRAPE. Guignardia bidwellii (black-rot). Grapes that were not thoroughly sprayed were infected moderately to severely with G. bidwellii. The losses ranged from a trace to 40% (average 10%).-- R. C. Baines.

DISEASES OF SPECIAL CROPS

BETA VULGARIS, SUGAR BEET. Cercospora beticola (leaf spot) was common on sugar beets in northeastern Indiana and between 50 to 60% of the leaves were infected severely. The loss in yield is estimated at 10%. -- R. C. Baines.

MENTHA PIPERITA, PEPPERMINT. Peppermint on the muck soils in northern Indiana was infected from a trace to severely with Sphaceloma menthae (anthracnose). The yield of oil-of-peppermint from the occasional severely infected fields was reduced approximately 50%, and the average reduction was estimated at 5%. -- R. C. Baines.

MENTHA SPICATA, SPEARMINT. The second growth of the "Scotch" variety of spearmint generally was infected severely with Puccinia menthae (rust) in northern Indiana. The infection developed too late to affect the yield of oil from the first cutting appreciably, but evidently weakened the plants seriously and thus rendered them more susceptible to cold injury during the winter.

Severe infection with Sphaceloma menthae developed on the second growth of the "scotch" variety in about 75% of the fields in northern Indiana. -- R. C. Baines.

ANTIRRHINUM MAJUS, SNAPDRAGON. Phyllosticta antirrhini (leaf spot) occurred in an occasional greenhouse and caused a trace of injury. Snapdragons in most greenhouses were affected with a trace or slight amounts of Puccinia antirrhini (rust), which caused no appreciable loss. -- C. T. Gregory.

Verticillium albo-atrum (wilt). In occasional greenhouses in Indiana 5 to 10% of the plants were infected with Verticillium albo-atrum. The loss for the State was a trace. -- C. T. Gregory.

CHRYSANTHEMUM spp., CHRYSANTHEMUM. In occasional plantings out-of-doors 50% of the plants were infected severely by Aphelenchus sp. (foliar nematode). -- C. T. Gregory.

Septoria chrysanthemella (leaf spot). Frequently from 5 to 10% of plants outdoors were moderately infected. However, there appeared to be only a trace of damage. -- C. T. Gregory and R. C. Baines.

Verticillium albo-atrum (wilt). From 0.5 to 10% of the plants frequently were infected. The average loss was about 1%. -- C. T. Gregory.

DIANTHUS CARYOPHYLLUS, CARNATION. Between 2 and 20% (average 5%) of the plants in a few greenhouses were infected by Fusarium sp. (branch rot). The estimated loss for the State was 1%. From 1 to 10% of the plants in greenhouses were affected by Pellicularia filamentosa (Corticium vagum) causing stem rot, and the estimated average loss was 2%.

Uromyces caryophyllinus (rust) affected between a trace and 10% of greenhouse plants, mostly in moderate infections. The loss in the State from rust was a trace. -- C. T. Gregory.

GLADIOLUS spp., GLADIOLUS. Varieties such as Picardy appeared to be especially susceptible to corm rot caused by Fusarium oxysporum f. gladioli. From a trace to 20%, average 0.5%, of the corms were infected. -- R. C. Baines and C. T. Gregory.

A trace of scab caused by Pseudomonas marginata was observed by C. T. Gregory.

LATHYRUS ODORATUS, SWEET PEA. Occasional greenhouse plantings of sweet peas were infected slightly by Erysiphe polygoni (powdery mildew) which caused a trace of loss. Rhizoctonia solani (root rot) occurred frequently on sweet peas in greenhouses and usually reduced the stand by 10%. -- C. T. Gregory.

PELARGONIUM spp., GERANIUM. Botrytis cinerea (gray mold) occurred commonly on geraniums in greenhouses and caused a trace of loss. Pseudomonas erodii (bacterial leaf spot) was prevalent on geraniums in green-

houses. From a trace to 100% of the plants were infected moderately. The average loss in value of the plants was estimated to be from 1 to 2%. -- C. T. Gregory.

PHLOX spp., PHLOX. Erysiphe cichoracearum (powdery mildew) was prevalent on phlox and impaired the ornamental value of this plant. -- R. C. Baines.

ROSA spp. cult., ROSE. Roses in all of the greenhouses examined were infected slightly to moderately with Diplocarpon rosae (black spot). It was estimated that the disease caused an average loss of 2%. Leptosphaeria coniothyrium (cane blight) occurred in most greenhouses and from 2 to 10% (average 4%) of the canes were killed. Sphaerotheca humuli (powdery mildew) occurred in traces in all greenhouses but caused no apparent loss. However, rambler roses outdoors were infected severely. -- C. T. Gregory.

TULIPA spp., TULIP. Botrytis tulipae (botrytis blight) was of general occurrence and caused 1 to 2% loss. -- R. C. Baines and C. T. Gregory.

PLANT DISEASES AND RESULTING CROP LOSSES IN ILLINOIS, 1943

R. C. Baines

This report was prepared in collaboration with G. H. Boewe of the Illinois State Natural History Survey, Section of Applied Botany and Plant Pathology; H. W. Anderson, A. S. Colby, Benjamin Koehler, M. B. Linn, and D. Powell, of the Illinois Agricultural Experiment Station; and W. B. Allington, of the Division of Forage Crops and Diseases, U. S. Bureau of Plant Industry, Soils, and Agricultural Engineering. Specific recognition for the information presented is made by name under each disease.

DISEASES OF VEGETABLE CROPS

ALLIUM CEPA, ONION

Phoma terrestris (pink root rot) appeared to be of general occurrence on onions in northern Illinois. Frequently from 5 to 30% of the roots were infected. The crop loss resulting was estimated to have been 1 to 2%. Very little infection by Urocystis cepulae (smut) developed on young onions in northern Illinois. Seed treatment appears to be effective in controlling this disease and generally is used. -- M. B. Linn.

BETA VULGARIS, BEET

Cercospora beticola (leaf spot) was of general occurrence, usually in moderate amounts. It appeared to cause a 4 to 5% average loss in yield. -- M. B. Linn and R. C. Baines.

BRASSICA OLERACEA var. CAPITATA, CABBAGE

Fusarium oxysporum f. conglutinans (yellows). In a few fields in northern Illinois about 30% of the plants were infected severely and failed to mature marketable heads. The average loss in the State from yellows was about 1%, according to M. B. Linn.

Phoma lingam (black leg). A half-acre field near Peoria was a complete

loss due to black leg. The average loss caused in the State was a trace. -- R. C. Baines and M. B. Linn.

CAPSICUM FRUTESCENS, PEPPER

Fusarium sp. (wilt). In an acre planting near Sterling, approximately 5% of the bell pepper plants were affected severely. The loss in this field from wilt amounted to about 5%. For the State it was a trace. -- M. B. Linn and R. C. Baines.

Xanthomonas vesicatoria (bacterial spot). Fruit and leaves of bell peppers in a 3-acre field near Rock Falls were slightly affected. The loss from this disease appeared to be a trace. -- R. C. Baines and M. B. Linn.

Tobacco mosaic (virus). Approximately 5% of the bell pepper plants in a 3-acre planting near Rock Falls were infected moderately with the tobacco-mosaic virus. The loss in this planting amounted to about 3%; for the State it was a trace. -- M. B. Linn and R. C. Baines.

Blossom-end rot (physiogenic) occurred in all pepper plantings examined, and resulted in an estimated 5% loss for the State. -- R. C. Baines and M. B. Linn.

CICHORIUM ENDIVIA, ENDIVE

Between 3 and 5% of the plants in a 1/5-acre planting near Peoria were infected severely with aster yellows (virus). The loss for the State was a trace. -- M. B. Linn and R. C. Baines

CITRULLUS VULGARIS, WATERMELON

Colletotrichum lagenarium (anthracnose). Moderate to severe infection of the leaves caused appreciable defoliation in most plantings. The average loss caused by anthracnose in Illinois was between 5 and 10%.

Fusarium oxysporum f. melonis (wilt). In a few fields near Havana and Thomas, from 25 to 90% of the vines were severely affected or killed by wilt. The average crop loss from wilt in Illinois was 10%.

Pythium sp. (blossom-end rot) occurred in all of the fields examined and the estimated average loss was 10%. -- R. C. Baines and M. B. Linn.

CUCUMIS MELO, CANTALOUP

Fusarium oxysporum f. melonis (wilt). In a 5-acre field near Havana approximately 2% of the plants were infected severely or killed by wilt. The average loss in the State was a trace. -- R. C. Baines and M. B. Linn.

CUCUMIS SATIVUS, CUCUMBER

Erwinia tracheiphila (bacterial wilt) was of general distribution in Illinois and caused an estimated average loss of 3 to 5% in yield. -- M. B. Linn.

CUCURBITA PEPO var. CONDENSA, SUMMER SQUASH

Choanephora cucurbitarum (blossom blight and fruit rot). In a garden near Urbana, occasional young squash fruits were rotted by this organism, according to M. B. Linn.

DAUCUS CAROTA, CARROT

From a trace to slight infection with Alternaria carotae (leaf blight) occurred in most carrot plantings, and a trace of Cercospora carotae (leaf blight) occurred in occasional plantings. In a few fields in Cook County 30% of the plants were infected with the aster yellows virus; the yield in these fields was reduced from 1 to 2%. -- M. B. Linn

IPOMOEA BATATAS, SWEETPOTATO

Actinomyces sp. (pox or soil rot). Slight infection of from a trace to 10% of the sweetpotatoes was noted in occasional fields. Average yield and grade was reduced a trace. -- R. C. Baines.

Ceratostomella. See Endoconidiophora.

Endoconidiophora fimbriata (Ceratostomella fimbriata) (black rot). Sweetpotatoes in a few fields at the time of digging showed from a trace to slight amounts of black rot. However, in storage houses during December a few lots contained 30 to 60% of the roots severely affected, and about 10% of the lots contained from 4 to 6% of affected roots. The estimated average loss from black rot was about 1%. -- R. C. Baines.

Fusarium oxysporum f. batatas. (Stem rot or wilt) occurred in half of the sweetpotato fields in southern Illinois. In occasional fields in Union County 30% of the plants were infected severely or killed. In about 10% of the fields, from 10 to 15% of the plants were infected severely; and in 20% of the fields less than 1% of the plants were infected. -- R. C. Baines and G. H. Boewe.

Fusarium surface rot affected from a trace to 0.5% of the sweetpotato lots examined in storage houses during the latter part of December. -- R. C. Baines.

Monilochaetes infuscans (scurf). A few affected roots were found in a field in Union County. -- R. C. Baines.

Pythium ultimum (ring rot) caused losses in storage houses ranging from 0.5 to 5% and averaging about 1%. -- R. C. Baines.

Rhizopus nigricans (soft rot) affected from a trace to 1% of the stored sweetpotatoes. -- R. C. Baines.

Sclerotium bataticola (charcoal rot) was found on occasional sweetpotatoes in storage. -- R. C. Baines.

Mosaic (virus). Most fields were free from mosaic. A few infected plants were found in one field in Union County. -- R. C. Baines.

LACTUCA SATIVA, LETTUCE

Approximately 5% of the lettuce plants in an outdoor planting near East St. Louis were infected with aster yellows (virus). -- M. B. Linn.

LYCOPERSICON ESCULENTUM, TOMATO

Alternaria solani (early blight). Tomatoes in most plantings were affected slightly with the leaf spot, which caused a trace of reduction in yield. -- R. C. Baines and M. B. Linn.

Cladosporium fulvum (leaf mold). Tomatoes in a greenhouse near Sterling were moderately infected, with about 2% loss in yield. -- M. B. Linn.

Colletotrichum phomoides (anthracnose) was moderately prevalent during August and September on ripe field-grown fruit. Loss of fruit and re-

duction in quality was estimated to be between 1 and 2%. -- R. C. Baines and M. B. Linn.

Corynebacterium michiganense (bacterial canker). Very few tomatoes affected with bacterial canker were observed in Illinois during 1943. -- M. B. Linn.

Fusarium oxysporum f. lycopersici (wilt) was especially serious in market-garden plantings of tomatoes, and between 10 and 30% of the plants were infected severely. In the acreage planted for canning about 1% of the plants were affected severely and produced little or no fruit. In a greenhouse near Bloomington approximately 30% of the spring crop was lost as a result of fusarium wilt. -- R. C. Baines and M. B. Linn.

Phytophthora parasitica (buckeye rot) affected 20% of the fruit on the first clusters to ripen in occasional early plantings. The loss for the State was a trace. -- M. B. Linn.

Septoria lycopersici (leaf spot) caused moderate to severe defoliation during August and September in central and northern Illinois. The average loss in yield was estimated at 5%. -- R. C. Baines and M. B. Linn.

Aster yellows (virus). An occasional tomato plant was infected with aster yellows during 1943. -- M. B. Linn and R. C. Baines.

Mosaic (virus). Tomatoes grown in the field and in greenhouses frequently were infected with mosaic. This disease was very prevalent on tomatoes in victory gardens. The average loss in yield is estimated at 1%. -- M. B. Linn and R. C. Baines.

In occasional greenhouses between a trace and 1% of the tomato plants were infected with the cucumber mosaic virus. -- M. B. Linn.

Leaf roll (physiogenic). Tomato plants in victory gardens, and especially staked plants, frequently were affected severely with this non-parasitic disease according to M. B. Linn.

PHASEOLUS LUNATUS, LIMA BEAN

Corticium. See Pellicularia.

Fusarium solani f. phaseoli (root rot) occurred in traces in most lima bean plantings. -- M. B. Linn

Fusarium sp. (pod rot). In commercial fields in northern Illinois between 1 and 2% of the pods that were in contact with the soil were rotted by Fusarium sp. -- M. B. Linn and R. C. Baines.

Pellicularia filamentosa (Corticium vagum). A few plants were infected and killed in most plantings. -- M. B. Linn.

Xanthomonas phaseoli (bacterial blight) caused 100% loss in a 30-acre field of lima beans grown for canning in northern Illinois. The average estimated loss for the State is 10%. -- M. B. Linn and R. C. Baines.

Mosaic (virus) infected a few plants in most plantings, but no appreciable loss resulted. -- M. B. Linn and R. C. Baines.

PHASEOLUS VULGARIS, GREEN BEANS

Fusarium solani f. phaseoli (root rot). Serious losses from root rot were rather local although this disease is widely distributed in Illinois. A 5-acre field of early-planted beans near East St. Louis was infected severely and was abandoned. The average loss in the State was a trace. -- M. B. Linn.

Pseudomonas medicaginis var. phascolicola (halo blight) occurred in traces in occasional plantings of green beans. -- M. B. Linn.

Xanthomonas phaseoli (common bacterial blight) was severe in occasional plantings; however, most plantings were free or showed only a trace. The loss for the State was a trace. -- M. B. Linn and R. C. Baines.

Mosaic (virus). Plantings were free from mosaic or only occasional plants were affected. -- M. B. Linn and R. C. Baines.

PISUM SATIVUM, PEA

Aphanomyces euteiches (root rot) occurred in trace amounts on peas in victory and home gardens. Mycosphaerella sp. (blight; Asochyta leaf and pod spot) occurred in traces in occasional plantings. Seed decay and post emergence damping-off, of undetermined cause, frequently resulted in serious reductions in stand of peas in garden plantings. -- M. B. Linn.

SOLANUM MELONGENA, EGGPLANT

Phomopsis vexans (fruit rot). In a market-garden planting near Rock Falls, 25% of the fruits were infected severely and rotted by P. vexans.-- M. B. Linn and R. C. Baines.

Verticillium albo-atrum (wilt) was of general occurrence in Illinois and from 5 to 100% of the plants usually were infected severely or killed. The average estimated loss from wilt was 40% of the yield. -- R. C. Baines and M. B. Linn

SOLANUM TUBEROSUM, POTATO

Actinomyces scabies (scab). Potatoes in Illinois usually were affected slightly to moderately with scab. -- R. C. Baines, G. H. Boewe, and M. B. Linn.

Erwinia phytophthora (E. atroseptica) (black leg) was especially serious on early-planted potatoes in the East St. Louis area, where the average loss was 5%. The loss for the State was a trace. -- M. B. Linn.

Phytophthora infestans (late blight). During the first half of September the foliage of potatoes in northwestern Illinois frequently was infected slightly to severely with P. infestans. Late blight was especially prevalent in Jo Daviess County and was more prevalent and severe on unsprayed than on sprayed potatoes.

Very little rot developed on the tubers even in fields in which the foliage was moderately infected. The dry weather during the latter part of September and during October evidently was unfavorable for infection of the tubers and the development of rot. -- G. H. Boewe, R. C. Baines, and M. B. Linn.

Leaf roll (virus) frequently affected 30% of the plants when common seed was used. It is estimated that leaf roll caused a reduction of 5% in the yield of potatoes in Illinois. -- M. B. Linn.

Hopperburn (leafhopper). Leafhoppers were very abundant and caused serious damage to potatoes in Illinois. It is estimated that in victory gardens the yield was reduced 50% and in commercial fields 20%, by hopperburn. -- M. B. Linn and G. H. Boewe

DISEASES OF CEREALS AND FORAGE CROPS

AVENA SATIVA, OATS

Puccinia coronata (crown rust) was very prevalent and severe during 1943. By harvest time, 100% of the oat plants were infected, except in fields of resistant varieties. The infection was especially severe in the northern and western counties and in an area in the east-central and south-central part of Illinois. From a trace to 41% (average 14%) of the leaf area of the plants was occupied by the rust pustules. For a more detailed report see PDR 27(17):346-347, 1943.

Puccinia graminis var. avenae (stem rust). Oats generally were affected with a trace to slight amounts of stem rust, which apparently caused an average loss of 1% in yield.

Ustilago avenae (loose smut) occurred in 80% of the 52 fields that were examined in Illinois. From none to 14% (average 3.2%) of the panicles were smutted. The highest level of infection occurred in the 2 tiers of counties across the northern part of Illinois. The average loss in yield from loose smut was about 4%.

Ustilago kolleri (U. levis) (covered smut) occurred in approximately 33% of the 32 fields that were examined and in amounts ranging from a trace to 9% (average 0.6% of the panicles smutted). -- G. H. Boewe.

HORDEUM VULGARE, BARLEY

Puccinia anomala (leaf rust). Barley generally was infected slightly by P. anomala in Illinois during 1943. Between a trace and 7% of the leaf area was affected by rust pustules and 0.5% loss in yield resulted.

Puccinia graminis var. tritici (stem rust) was light and occurred only in the northern 2/3 of the State. It caused no apparent loss in yield of barley in Illinois in 1943.

Ustilago jensenii (U. hordei) (covered smut) occurred only in the southern third of Illinois, the winter barley region. The infection was light and spotty. In one field 3% of the heads were smutted.

Ustilago nuda and other species (loose smut) occurred throughout Illinois in amounts ranging from a trace to 1%. -- G. H. Boewe.

MEDICAGO SATIVA, ALFALFA

Cercospora zebrina (leaf spot) occurred generally, in slight amounts.

Pseudopeziza medicaginis and Pyrenopeziza medicaginis (leaf spots). Usually alfalfa in Illinois was affected slightly to moderately with both of these leaf spot diseases and slight defoliation resulted. -- G. H. Boewe.

SECALE CEREALE, RYE

Puccinia rubigo-vera var. secalis (leaf rust) occurred as slight infections in most fields. Urocystis occulta (stem smut) was not observed in Illinois during 1943. Ustilago tritici (loose smut) apparently did not occur in Illinois during 1943. -- G. H. Boewe.

SOJA MAX, SOYBEAN

Cercospora sojina (C. daizu) (frog-eye leaf spot). Soybeans in occasional fields in southern Illinois were infected slightly or moderately. Only a trace was observed in a few fields north of Urbana. The loss for the State was estimated at a trace. -- G. H. Boewe and W. B. Allington.

Diaporthe sojae (pod and stem blight). At harvest soybeans generally were infected severely with D. sojae. However, infection occurred late in the development of the soybeans and caused slight reduction (0.5%) in yield. -- W. B. Allington, G. H. Boewe, and R. C. Baines.

Glomerella glycines (anthracnose). During the fall soybeans in occasional fields were infected slightly; however, the seeds were well-matured at the time of infection and the yield apparently was not impaired. -- W. B. Allington and R. C. Baines.

Peronospora manshurica (downy mildew). Soybeans in Illinois were affected slightly to moderately with downy mildew. The variety Illini appeared to be very susceptible. The average estimated reduction in yield was a trace. -- W. B. Allington, G. H. Boewe, and R. C. Baines.

Xanthomonas phaseoli var. sojense (pustular spot). All of the standard varieties of soybeans in Illinois were infected slightly to moderately with X. phaseoli var. sojense which very likely caused a 3 to 4% reduction in yield. -- W. B. Allington, G. H. Boewe, and R. C. Baines.

Mosaic (virus) infected from a trace to 2 or 3% of the plants in many fields. -- W. B. Allington and G. H. Boewe.

Streak or bud blight (tobacco ringspot virus) was distributed widely in Illinois. Usually about 1% of the plants were infected, but in occasional fields in central Illinois 50% of the plants showed severe symptoms of this disease and the yield was reduced approximately 25% in these fields. The average estimated reduction in yield from bud blight in Illinois was 1%.

Streak or bud blight is a disease of apparently recent occurrence, which is capable of causing serious crop losses. Occurrence of the virus on soybean was first reported from Indiana in 1941 by R. W. Samson (see above, page 179). During 1943, this disease of soybeans was widespread in Illinois and Indiana. Little is known concerning infection sources or method or rate of dissemination and the disease should be watched closely to prevent possible serious spread. -- W. B. Allington, G. H. Boewe, and R. C. Baines.

Wildfire, a bacterial disease caused by an undetermined organism, occurred in scattered fields over the State. In many fields the infection was slight, and either general or occurring in small local areas. In one field soybeans in a small area were infected severely. The loss from this disease during 1943 was slight. -- W. B. Allington and G. H. Boewe.

TRIFOLIUM PRATENSE, RED CLOVER

Cercospora zebrina (leaf spot) occurred generally in moderate to severe infections, the average reduction in yield and quality of the hay being estimated at 10%. -- R. C. Baines.

TRITICUM AESTIVUM, WHEAT

Gibberella zeae (scab) occurred in epidemic severity on wheat in Illinois during 1943. In the northeastern part between 0.5 and 2.9% (average 1.9%) of the wheat spikelets were infected with G. zeae. In southern

and eastern Illinois from 0.2 to 1.9% (average 0.8%) of the spikelets were infected severely. Scab was especially severe in the large central part of the State, and losses in yield in this area ranged from 3 to 19% (average 11%). For a more detailed report see PDR 27(14):271, 1943.

Puccinia graminis var. tritici (stem rust). Wheat throughout most of Illinois was infected very slightly. In most fields from 60 to 100% of the culms were affected with a trace to slight stem rust at harvest. However, in one field in Whiteside County and one field in Fulton County 9.7 and 8.0% of the stem area of the upper internodes were affected by rust, respectively. The infection in the State as a whole was slight and the loss was probably 1%.

Puccinia rubigo-vera var. tritici (leaf rust) occurred in all of the fields examined, and from a trace to 26% (average 9.3%) of the leaf area of the plants was destroyed by the rust pustules. The reduction in yield possibly was directly proportional to the leaf area destroyed. See also PDR 27(17):346, 1943.

Tilletia foetida (T. levis) (bunt) occurred in only 2 of the 41 fields of wheat that were examined in Illinois during 1943. In these 2 fields 0.9 and 2% of the heads were smutted.

Ustilago tritici (loose smut). Infection was general and slight through most of Illinois, except in a small area in the east-central part, in which the level of infection was much higher than in the remainder of the State. The percentage of heads smutted and the loss in yield ranged from none to 27% and averaged 2.6%. For detailed information regarding the amount of loose smut in different areas of Illinois see PDR 27(17): 343, 1943. -- G. H. Boewe.

ZEA MAYS, CORN

Aspergillus sp. (ear rot). An occasional ear infected with Aspergillus sp. occurred in about 8% of the fields examined. -- G. H. Boewe and R. C. Baines.

Bacterium stewartii (bacterial wilt, bacterial leaf blight). Generally the early-planted sweet corn was affected slightly by wilt. The amount of inoculum was low in the spring, because of low winter temperature, but increased during the summer and caused severe leaf blight of field corn in the central and southern Illinois areas. Losses in yield from leaf blight varied from a trace to possibly 2%. -- B. Koehler, R. C. Baines, and G. H. Boewe.

Cephalosporium acremonium and other causes (black bundle). Corn affected with the black-bundle disease or exhibiting a somewhat similar diseased condition occurred in 43% of the fields. This disease was especially prevalent in southern Illinois and corn in a few fields was severely damaged. The average loss in yield for the State was about 5%. -- G. H. Boewe, R. C. Baines, and B. Koehler.

Diplodia zeae (stalk rot and ear rot). Diplodia stalk rot occurred in all fields examined and ranged from 1 to 71% of the stalks infected severely. Infected stalks in most fields had produced ears with well-matured grain. However, grain produced on infected plants appeared not to be quite so well filled as that produced by apparently healthy plants. In some fields losses of 10% in yield occurred, and the average estimated

loss was 4%.

Diplodia ear rot occurred in 46% of the fields examined and up to 5% of the ears were infected. The average loss in yield for the State was 1.5%. The percentage of ears infected with D. zeae was less than occurs in most years and it appeared that the low rainfall during September and October was unfavorable for the spread and development of this rot. -- G. H. Boewe, R. C. Baines, and B. Koehler.

Fusarium spp. (fusarium ear rot) occurred in all fields examined and on 12% of the ears. This rot usually followed ear-worm injury and generally only the tips of the ears were affected. The estimated average loss in yield was 1%. -- G. H. Boewe, R. C. Baines, and B. Koehler.

Gibberella zeae (Gibberella ear rot) occurred in 38% of the fields and on 0.5% of the ears. The loss due to the ear rot and to stalk rot was estimated to be 1%. -- G. H. Boewe, R. C. Baines, and B. Koehler.

Helminthosporium turcicum (leaf blight). From a trace to slight infection occurred on corn in many fields. One field in Christian County was severely affected and the yield reduced about 10%. The loss in yield for the State was a trace. -- B. Koehler, R. C. Baines, and G. H. Boewe.

Nigrospora sphaerica (cob rot) occurred in 19 % of the fields and on 0.6% of the ears. The estimated average loss in yield was 0.2%. -- G. H. Boewe, R. C. Baines, and B. Koehler.

Penicillium sp. (ear rot) occurred in 87% of the fields, on 6% of the ears. This rot usually followed ear-worm injury and generally occurred at the tips of the ears. The estimated average loss in yield was 0.2%.-- G. H. Boewe, R. C. Baines, and B. Koehler.

Puccinia sorghi (rust). Occasional scattered fields in northern Illinois were infected slightly to moderately. No apparent loss in yield resulted. -- R. C. Baines and G. H. Boewe.

Pythium arrhenomanes and other fungi (root rot). Root rot was unusually prevalent on early-planted sweet corn and field corn and possibly was favored by the high soil moisture and low temperature during this period. The root rot in many cases did not kill the plants, but caused them to be barren. Many market-garden plantings were replanted because of poor stands and weakened plants. The estimated reduction in yield of field corn was 5%. -- B. Koehler.

Rhizopus nigricans (ear rot). An occasional slightly infected ear occurred in 11% of the fields examined. There was no apparent loss. -- G. H. Boewe and R. C. Baines.

Sclerotium bataticola (charcoal rot). In occasional corn fields in southern Illinois from a trace to 26% of the plants were affected severely with charcoal rot. The average loss in yield in Illinois was a trace. -- G. H. Boewe.

Ustilago maydis (smut) was much less prevalent than normal. From none to 15% (average 2.5%) of the stalks were infected, usually slightly. In 50% of the fields between a trace and 9% of the ears were smutted. The estimated average loss in yield from smut was 1%. -- G. H. Boewe, R. C. Baines, and B. Koehler.

DISEASES OF FRUIT CROPS

AMYGDALUS PERSICA, PEACH. A trace of Cladosporium carpophilum (scab) occurred on peaches in southern Illinois during 1943. -- D. Powell, G.H. Boewe, H. W. Anderson.

Monilinia fructicola (Sclerotinia fructicola) (brown rot). Blossom blight was severe in one planting of Red Bird peach trees in southern Illinois and possibly also occurred in other orchards. In most orchards in southern Illinois 1% of the fruit was affected by the fruit rot. -- D. Powell, G. H. Boewe, and R. C. Baines.

Taphrina deformans (leaf curl) occurred in trace amounts. -- G. H. Boewe and D. Powell.

Xanthomonas pruni (bacterial spot). Moderate to severe infection of peach leaves occurred in most orchards, resulting in 30 to 40% defoliation in many cases. Approximately 10% of the fruit was infected slightly. -- D. Powell, G. H. Boewe, H. W. Anderson, and R. C. Baines.

FRAGARIA, STRAWBERRY. Strawberries generally were infected slightly to moderately with Mycosphaerella fragariae (leaf spot), which did not appear to cause any appreciable reduction in yield. Phytophthora fragariae (red stele) was very prevalent during the spring of 1943, especially on strawberries planted on heavy poorly drained soil. The high rainfall during May apparently was favorable for its development. The highly resistant varieties Pathfinder and Aberdeen were infected moderately to severely when planted on poorly drained soil infested with the organism. -- A. S. Colby.

MALUS SYLVESTRIS, APPLE. A trace of Erwinia amylovora (fire blight) occurred on apples in Illinois during 1943. -- H. W. Anderson and D. Powell.

Glomerella cingulata (bitter rot). Golden Delicious, Grimes Golden, and Jonathan apples in southern Illinois were infected severely. The percentage of fruits infected in different orchards ranged from a trace to 100. The variations in the severity of bitter rot in different orchards apparently were caused by differences in the quantity of initial inoculum present in the orchards and in the thoroughness and timeliness of fungicidal applications to control the disease. The estimated average loss of fruit caused by bitter rot in Illinois was 1%. -- H. W. Anderson, D. Powell, G. H. Boewe, and R. C. Baines.

Gloeodes pomigena (sooty blotch) affected a trace of the fruit in most orchards. -- R. C. Baines, D. Powell, and H. W. Anderson.

Gymnosporangium clavipes (G. germinale) (quince rust). An occasional (trace) Delicious, Rome Beauty, or Winesap apple was infected severely. -- H. W. Anderson, D. Powell, and R. C. Baines.

Gymnosporangium juniperi-virginianae (apple rust) was very severe in local areas in southern Illinois in which cedar trees are numerous and rust has been noted in the past. In one orchard that received sprays of wettable sulfur from 90 to 100% of the foliage and 14% of the fruit of Jonathan trees were infected severely. The foliage and fruit of Rome Beauty trees usually were infected moderately. The average estimated loss for the State from apple rust was 1%. -- H. W. Anderson, D. Powell, G. H. Boewe, and R. C. Baines.

Phyllosticta solitaria (blotch) was severe on Duchess and Yellow Transparent apples, which are planted extensively in southern Illinois. Blotch was also severe on the few Northwestern Greening and Winter Banana trees that usually occur in the small orchards scattered over Illinois. Between a trace and 100% of the fruit was infected severely. In a few presumably well-sprayed orchards 70% of the fruit was infected. The average estimated loss caused by blotch on these 4 very susceptible varieties was 20%. -- D. Powell and H. W. Anderson.

Physalospora obtusa (black rot, frog-eye). Frog-eye leaf spot was of general occurrence on apples in Illinois. Infection ranged from a trace to slight and apparently caused a slight reduction in yield. Black rot was more prevalent in southern Illinois than in the northern part. Approximately 10% of the Gano and 2% of the Jonathan fruit in southern Illinois were infected. The estimated average loss from black rot in the State was 3%. -- D. Powell, G. H. Boewe, H. W. Anderson, and R. C. Baines.

Venturia inaequalis (scab) was more prevalent and severe during 1943 than normally. In poorly-sprayed orchards 100% of the leaves and fruit were infected severely, and in well-sprayed orchards from a trace to 18% of the fruit was infected. It was estimated that 15 to 20% of the fruit was affected, and that the average monetary loss to the growers was 10% of the value of the crop. -- D. Powell, G. H. Boewe, H. W. Anderson, and R. C. Baines.

PRUNUS CERASUS, SOUR CHERRY. Unsprayed sour cherry trees were severely defoliated by Coccomyces hiemalis (leaf spot) and trees that had been sprayed to control the disease usually were infected and defoliated moderately. -- G. H. Boewe and R. C. Baines.

Occasional fruits were infected with Monilinia fructicola (Sclerotinia fructicola) (brown rot); however, no appreciable loss resulted. -- G. H. Boewe.

PYRUS COMMUNIS, PEAR. A trace of fire blight (Erwinia amylovora) occurred on pears in 1943. -- G. H. Boewe.

RUBUS sp., BLACKBERRY. Occasional plantings of blackberries in southern Illinois were infected severely with Gymnoconia peckiana (G. interstitialis) (orange rust). The Alfred variety appeared to be very susceptible and the Eldorado highly resistant. -- A. S. Colby.

RUBUS sp., RASPBERRY. Agrobacterium tumefaciens (crown gall) occurred in most plantings of raspberries in Illinois. Usually the plantings were infected slightly to moderately. Black raspberries usually were more severely infected than red raspberries. -- A. S. Colby.

Elsinoë veneta (anthracnose). Young raspberry canes usually were infected moderately to severely. -- D. Powell, G. H. Boewe, and R. C. Baines.

Raspberries generally were infected severely with Sphaerulina rubi (leaf spot), which caused severe defoliation by early fall. The loss in yield caused by leaf spot was not known; however, it appears that early defoliation weakens the plants and makes them more susceptible to injury from low temperature. -- A. S. Colby and R. C. Baines.

Virus diseases, chiefly mosaic. Occasional plants infected with mosaic occurred in a few plantings. -- A. S. Colby.

VITIS spp., GRAPE. A severe outbreak of Cryptosporella viticola (dead arm) occurred in the Illinois Experiment Station vineyard at Urbana and

in occasional vineyards over the State. The disease apparently had been spreading in the Experiment Station vineyard for about 3 years. The spring of 1943 was very favorable for the spread of the disease and lesions occurred on the current year's shoots of the 56 varieties in the vineyards. Differences in varietal susceptibility occurred. The dead arm or dieback phase of this disease was not so abundant or evident as the lesions on the new growth. See also PDR 17(12/13): 245-246, 1943. -- H. A. Anderson and A. S. Colby.

Grapes generally were infected moderately with Guignardia bidwellii (black rot) in Illinois. -- H. W. Anderson, D. Powell, G. H. Boewe, R. C. Baines, and A. S. Colby.

Very little Plasmopara viticola (downy mildew) developed on grapes in Illinois during 1943. -- D. Powell

PLANT DISEASES IN MICHIGAN DURING 1943

M. R. Harris

The weather in Michigan during the first part of the 1943 season was very unfavorable to agriculture. Rainfall was heavy and continuous for much of the fore part of the summer. As a result crops were a month late in starting and in many instances were not planted at all. The acreage of some crops such as sugar beets was very drastically reduced. As the summer advanced the weather improved and these crops that were planted began to make a satisfactory growth. However frost in many parts of the State was a week to 10 days earlier than usual and made the season for crops which freeze easily rather short. After a cold beginning the fall season was very favorable for the maturity and harvesting of crops and such things as soybeans and corn dried out well. This resulted in better yields than had been anticipated for most late crops.

VEGETABLES

ALLIUM CEPA, ONION. Onions were not damaged by downy mildew (Peronospora destructor) because the weather was too variable to permit development of the disease. Pink root (Phoma terrestris) did considerable damage but came so late in the season that it did not reduce the crop. There was considerable scald due to hot sun cooking the bulbs. Smut was found but treatment of the seed at planting kept the fungus (Urocystis cepulae) from doing much damage.

ARIUM GRAVEOLENS, CELERY. Celery was infected with early blight (Cercospora apii) and over the State generally there was a 4% loss. Yellows (Fusarium oxysporum f. apii) (F. apii and F. apii pallidum) was not a factor in celery production this year owing to low soil temperatures. Late blight (Septoria apii-graveolentis) caused a 6% loss over the State generally and was favored by a wet cool season.

BRASSICA OLERACEA var. CAPITATA, CABBAGE. Cabbage yellows (Fusarium oxysporum f. conglutinans) was responsible for a 3% loss over the State

generally but the loss was greatly reduced by the use of resistant varieties. In some fields where susceptible varieties were planted the loss was total.

CUCUMIS MELO, CANTALOUP. Cantaloups were severely infected with anthracnose (Colletotrichum lagenarium) in some fields and over the State, generally loss was 10%. In some fields the disease was partially controlled by spraying. Macrosporium leaf spot (Alternaria cucumerina) also caused a 10% loss. Traces of mosaic (virus) were found but no appreciable damage was caused.

DAUCUS CAROTA, CARROT. Carrots were as a rule a healthy crop but in the Detroit market garden area there was some defoliation caused by leaf blight (Alternaria carotae) (Macrosporium carotae).

LACTUCA SATIVA, LETTUCE. Lettuce over the state generally was severely affected with the aster yellows virus. There was a great prevalence of the insect vector. Many fields were a complete loss and it is estimated that for the State generally 75% of the crop was lost.

LYCOPERSICON ESCULENTUM, TOMATO. Tomatoes were adversely affected by poor weather conditions earlier in the season. Early blight (Alternaria solani) was present on plants imported from the southern states. Canker (Corynebacterium michiganense) (Aplanobacter michiganense) was also found on plants coming in from nurseries in the southern States. Anthracnose (Colletotrichum phomoides) was severe in some fields causing damage to the fruit. It reduced the crop over the State generally by 5%. Fusarium wilt (Fusarium oxysporum f. lycopersici) caused a 1% loss. There were traces here and there of blossom-end rot (physiogenic) and mosaic and spotted wilt (viruses). In the Victory gardens around Detroit blight (Septoria lycopersici) was severe in spots and caused a 1% reduction of the crop.

PHASEOLUS VULGARIS, BEAN. Beans in some of the market gardens around Detroit were severely infected with anthracnose (Colletotrichum lindemuthianum). About 2% of the total crop was lost. Bacterial blight (Xanthomonas (Phytomonas) phaseoli and Corynebacterium (P.) flaccumfaciens) was severe on Black Valentine, Bountiful, and Plentiful varieties in market gardens and reduced the crop by 2%.

SOLANUM TUBEROSUM, POTATO. The potato crop of Michigan was reduced by scab (Actinomyces scabies) by approximately 10% last season. Early blight (Alternaria solani) was not severe and caused a 2% reduction of the crop. A trace of ring rot (Corynebacterium (Bacterium) sepedonicum) was found in a few fields. Black leg (Erwinia phytophthora) (E. atroseptica) was favored by weather conditions and caused a 1% loss to the crop. Traces of fusarium wilt (Fusarium oxysporum) also favored by weather conditions, were noted. It is estimated that damage caused by leafhoppers was sufficient to cause a 25% reduction of the crop. In some fields this insect caused a total loss. Late blight (Phytophthora infestans) was present in many fields but owing to variable weather conditions during the latter part of the season it never became serious. The estimated loss is only 0.35% for the entire State although individual fields showed as high as 80% loss. Scurf (Rhizoctonia solani) caused a 1% loss to the crop. A trace of purple top wilt caused by aster yellows virus was seen in one field. Traces of the virus diseases, leaf roll, mosaic,

spindle tuber, and yellow dwarf, were observed but these did no appreciable damage.

FIELD CROPS

AVENA SATIVA, OATS. A severe leaf rust (Puccinia coronata) infection of oats reduced the crop by 20% during the past season. A Michigan hybrid strain of high yielding qualities was severely affected by the rust for the first time this season. Loose smut (Ustilago avenae) and covered smut (Ustilago kolleri) (U. levis) each reduced the oat crop yield by 0.2%.

BETA VULGARIS, SUGAR BEET. Sugar beet leaf spot (Cercospora beticola) caused a loss of 0.2%. The acreage of sugar beets in the State was drastically reduced by poor weather conditions at the time of planting. As a result various root-rotting fungi damaged the young plants and it is estimated that the total damage from these fungi was 10%.

HORDEUM VULGARE, BARLEY. Barley head blight (Gibberella zeae) (G. saubinetii) reduced the yield by 10%. Blotch (Helminthosporium sativum) caused 0.5% loss. There was a trace of stem rust (Puccinia graminis) in some fields. Loose smut (Ustilago nuda) and covered smut (Ustilago jensenii) (U. hordei) each caused a 0.1% loss.

MEDICAGO SATIVA, ALFALFA. Alfalfa fields were generally infected with wilt and root rot (Corynebacterium insidiosum) (Phytomonas insidiosa) and there is some loss each year in at least half of the fields in the State. It is estimated that the yearly loss is 5%. Damage amounting to a trace is caused by leaf spot (Pseudopeziza medicaginis).

SOJA MAX, SOYBEAN. Soybeans in Michigan were planted late and consequently matured late. Frost caught many late fields. A trace of frog-eye spot (Cercospora sojina) (C. daizu) was found in many fields. In a few fields a trace of pod and stem blight (Diaporthe sojae) was seen but no damage was noted. Likewise anthracnose (Glomerella glycines) was found on a plant here and there in a few fields. Downy mildew (Peronospora manshurica) at one time during the latter part of the season appeared to be about to cause some damage but never developed beyond a trace in most fields. In many fields an occasional plant showing virus symptoms could be seen but no seriously infected field was seen. Bacterial pustule (Xanthomonas phaseoli var. sojense) was by far the most common disease seen and no field appeared to be completely free from it. It is estimated that it caused a leaf fall reducing the crop by 2%.

TRITICUM AESTIVUM, WHEAT. Wheat head blight (Gibberella zeae) (G. saubinetii) caused a 10% reduction in the yield of that crop. Stem rust (Puccinia graminis) reduced the yield by 3% and leaf rust (Puccinia rubigo-vera var. tritici) (P. triticina) by 2%.

MISCELLANEOUS HOSTS

FRUIT CROPS. Owing to restrictions on travel by the experiment station staff, no very extensive observations were made on fruit diseases. It was noted that brown rot (Monilinia (Sclerotinia) fructicola) and leaf

spot (Coccomyces hiemalis) each reduced the cherry crop by 10%. Brown rot was also severe on peaches causing a 10% reduction of the crop while peach canker (Valsa leucostoma) killed 5% of the peach trees. Apple scab (Venturia inaequalis) was severe in many of the State's orchards and caused a loss of 10% over the State generally.

MENTHA spp., MINTS. The growing of mint crops is an important industry in Michigan. Diseases of mints may be serious. Anthracnose on peppermint (Sphaceloma menthae) was not severe but traces were present. Winter injury killed about 15% of the plants last winter when the snow melted and a severe freeze followed. Wilt (Verticillium sp.) killed about 5% of the crop. Rust (Puccinia menthae) is severe some seasons and this year affected late cuttings. In one field it reduced the crop by 20% but generally was present only as a trace.

PICEA sp., SPRUCE. Among the forest trees rust (Chrysomyxa cassandrae) on spruce was very severe in many locations in the north central part of the State. On some trees as much as 30% of the needles were infected.

PLANT DISEASES OBSERVED IN WISCONSIN IN 1943

Edwin E. Honey and R. E. Vaughan

VEGETABLE DISEASES

ALLIUM CEPA, ONION. Neck rot (Botrytis sp.) was less important than usual, owing probably to good weather at harvest time. The usual scattered traces of anthracnose (Colletotrichum circinans) were observed. Smut (Urocystis cepulae) as usual, was scattered in distribution, being found only on soil long used for growing onions.

APIUM GRAVEOLENS, CELERY. The usual slight amounts of early blight (Cercospora apii) and moderate amounts of late blight (Septoria apii) occurred. Stem canker due to boron deficiency is decreasing since growers have been using boron for its control.

ASPARAGUS OFFICINALIS, ASPARAGUS. Rust (Puccinia asparagi) was of slight importance, as usual. The resistance of the Washington varieties is not complete.

BETA VULGARIS, GARDEN BEET. Leaf spot (Cercospora beticola), although less prevalent than usual, was observed in various gardens, and in particular in Dane County and central Wisconsin where it was present but not destructive during the August dry period. Scab (Actinomyces scabies) and damping-off (Rhizoctonia and/or Pythium) were of the usual slight importance. More internal black spot due to boron deficiency was noted than occurred during the preceding year, although boron for soil treatment is generally available to canners in affected regions.

BRASSICA CAMPESTRIS, RUTABAGA. A greatly expanded acreage planted to rutabagas was accompanied by an increase in prevalence of black rot (Xanthomonas campestris). Internal spot due to boron deficiency is being controlled by the use of boron in fertilizer and is decreasing in importance.

BRASSICA OLERACEA var. BOTRYTIS, BROCCOLI and CAULIFLOWER. Black rot (Xanthomonas campestris) was noted to a slight extent as usual on both crops. Yellows (Fusarium oxysporum f. conglutinans) was of the usual slight local importance on cauliflower.

BRASSICA OLERACEA var. CAPITATA, CABBAGE. Leaf spot (Alternaria circinans) (A. brassicae), yellows (Fusarium oxysporum f. conglutinans), and black leg (Phoma lingam) were scattered in occurrence and of slight importance to the crop as a whole, as usual. Dry hot weather favored the development of yellows in the Racine area of southeastern Wisconsin. Much more club root (Plasmodiophora brassicae) than usual was observed. Black rot (Xanthomonas campestris) was more prevalent in some areas than during the year before. The disease was conspicuous in the Outagamie County area in northern Wisconsin, while less was noted in the vicinity of Racine. Most of this trouble is traceable to lack of rotation or to use of plants from infected seedbeds.

A mosaic (virus) that is being investigated by Dr. J. C. Walker and his associates, occurred in scattered localities.

CAPSICUM FRUTESCENS, PEPPER. Bacterial leaf spot (Xanthomonas vesicatoria) was scattered in distribution.

CUCUMIS MELO, CANTALOUP. Scattered infections of leaf blight (Alternaria cucumerina) and downy mildew (Pseudoperonospora cubensis) were noted, but dry weather prevented significant development. The reduction in acreage planted to cantaloups gave a better chance for crop rotation with a consequent decrease in amount of anthracnose (Colletotrichum lagenarium) from the preceding year. Mosaic (virus) occurred in scattered infections and was of slight importance as usual.

CUCUMIS SATIVUS, CUCUMBER. Leaf blight (Alternaria cucumerina) scab (Cladosporium cucumerinum), anthracnose (Colletotrichum lagenarium), bacterial wilt (Erwinia tracheiphila), and angular leaf spot (Pseudomonas lachrymans) were of average importance or somewhat less. Powdery mildew (Erysiphe cichoracearum) was observed in Portage County. Mosaic (virus) occurred locally in moderate amounts. In Portage County in central Wisconsin, frost injury that occurred in the early part of June when the plants had about 5 leaves, was evident in August as brown necrotic areas on the leaf edges.

DAUCUS CAROTA, CARROT. Leaf blight (Cercospora carotae) was generally distributed but was held in check by hot dry weather and only the lower leaves were affected. Yellows (aster yellows virus) was general in occurrence and of moderate importance.

LYCOPERSICON ESCULENTUM, TOMATO. Early blight (Alternaria solani) and leaf spot (Septoria lycopersici) were general in occurrence, but dry weather during the summer and also, in the case of Septoria, the increased use of mulching, resulted in less loss than average. Dusting for control is not recommended for Wisconsin conditions and little is done. Anthracnose (Colletotrichum phomoides) appeared in scattered locations late in the season. Wilt (Fusarium oxysporum f. lycopersici) was noted in a field near a greenhouse. Specimens of fruit affected by buckeye rot (Phytophthora parasitica) were received from Polk and Taylor Counties in northern Wisconsin September 1. A considerable amount of blossom-end rot (physiogenic) occurred in the Racine area which was affected by drought; elsewhere, a reasonable amount of rainfall resulted in less blossom-end rot

than usual.

Leaf mold (Cladosporium fulvum) was more prevalent on greenhouse tomatoes than usual because of delay in heating the houses. Rootknot (Heterodera marioni) was observed only in greenhouses.

PASTINACA SATIVA, PARSNIP. Leaf spot (Cylindrosporium pastinacae) (Phyllachora pastinacae), was observed in farm and victory gardens in Dane and Columbia Counties. Yellows caused by the aster yellows virus was reported from Door County.

PHASEOLUS VULGARIS, BEAN. No disease was recorded as very important. The bacterial blights (Pseudomonas medicaginis var. phaseolicola and Xanthomonas phaseoli), anthracnose (Colletotrichum lindemuthianum), dry root rot (Fusarium solani f. phaseoli) (F. martii phaseoli), stem canker (Rhizoctonia sp.), rust (Uromyces phaseoli var. typica), and mosaic (virus) were observed to occur in the usual prevalence or less.

PISUM SATIVUM, PEA. Root rot (Aphanomyces euteiches) is a very important disease of peas in Wisconsin; it occurs generally where peas are grown and affects all varieties. In 1943 an increase in prevalence from the normal was due to the reuse of infested soil and to favorable wet weather; however, there was less than in 1942. Wet weather also favored general occurrence and increased amounts of bacterial blight (Pseudomonas pisi), and anthracnose (Colletotrichum pisi), and also the ascochyta blights (Mycosphaerella pinodes, Ascochyta pisi, and A. pinodella), of which M. pinodes was most important. No cases of fusarium wilt (Fusarium oxysporum f. pisi race 1) (F. orthoceras var. pisi) were seen; since resistant varieties are used where the soil is known to be infested this disease has become unimportant. Fusarium root rot (F. solani f. pisi) also was of slight importance and less prevalent than usual. Near wilt (F. oxysporum f. pisi race 2), on the other hand, was more abundant than during the preceding year. Powdery mildew (Erysiphe polygoni), downy mildew (Peronospora pisi), and blotch (Septoria pisi) were of slight importance as usual. The virus diseases mosaic and streak caused moderate damage.

SOLANUM MELONGENA, EGGPLANT. Occasional plantings of this crop were noted. Dry weather held the blight due to Phomopsis vexans in check and it caused very little fruit rot, occurring mostly as a leaf spot.

SOLANUM TUBEROSUM, POTATO. Scab (Actinomyces scabies) is a major disease of potatoes in Wisconsin, and in 1943 was even more important than usual. Dry weather while the crop was maturing favored its development, and infection in some fields ranged up to as much as 85%; for the State loss is estimated at 4%. The varieties Russet Rural and Russet Burbank were resistant.

A marked increase in amount of bacterial ring rot (Corynebacterium sepedonicum) over the preceding year was evident. It is not generally distributed in the State, occurrence being limited to scattered locations. Vine symptoms were obscured by the prevalence of late blight and hopperburn. Up to 50% field infection was observed, while the loss for the State was a trace.

Late blight (Phytophthora infestans), while less damaging than in 1942, was more prevalent than usual. Infection was general except in the drought area of southeastern Wisconsin. Elsewhere in the State wet weather until the latter part of June favored vine infection. Drought and high

temperatures after June 20 checked the development of the disease, although in northern Wisconsin local rains resulted in some damage from tuber rot. Much more use was made of copper sprays and dusts than usual, but the amount of spraying was limited by availability of machines. Reduction in yield due to late blight amounted to 5%; tuber rot caused 4% loss.

Other diseases, of minor importance, that were more prevalent than usual were wilt caused by Fusarium avenaceum and silver scurf caused by Spondylocladium atrovirens. Loss from wilt was estimated at a trace.

Average amounts of early blight (Alternaria solani), and black leg (Erwinia phytophthora) were noted, while rhizoctonia (Pellicularia filamentosa) (Corticium vagum) was less prevalent than usual. These diseases ordinarily are unimportant.

Of the virus diseases, mild crinkle mosaic was locally distributed and caused moderate damage, as usual. Resistant varieties grown include Rural, Chippewa, Katahdin, Sebago, and Warba, while Green Mountain and Triumph are susceptible. Leaf roll, spindle tuber, and yellow dwarf are scattered in occurrence and of minor importance; in 1943 leaf roll and spindle tuber were average in prevalence, while less yellow dwarf was noted than usual. Sebago and Katahdin are susceptible to the curl type of leaf roll, and Sebago is resistant to yellow dwarf. Spindle tuber is prevalent in rundown stocks of Chippewa.

The increased application of sprays and dusts resulted in less hopperburn due to leafhoppers than usually occurs. This trouble was most prevalent in the drought-affected southeastern part of the State. Loss was estimated at 0.5%.

Spindle sprout and sprain (both undetermined) were noted in slight amounts in scattered locations.

Discoloration of tubers following cooking (physiogenic) developed to a less extent than usual.

Injury from frost occurring before harvest was spotted in distribution and caused a trace of loss. Much less sun scald developed than usual; loss was practically none.

TRAGOPOGON PORRIFOLIUS, SALSIFY. Yellows caused by the aster yellows virus was observed on salsify in Door County, where the disease was abundant and severe.

DISEASES OF CEREALS, GRASSES, AND FORAGE CROPS

AGROPYRON REPENS, QUACK GRASS. Diseases observed are ergot (Claviceps purpurea) in Dane and Waupaca Counties; and powdery mildew (Erysiphe graminis), tar spot (Phyllachora graminis), and stem rust (Puccinia graminis) which were all of general occurrence.

AGROSTIS ALBA, RED TOP. Leaf rust (Puccinia rubigo-vera) and brown stripe (Scolecotrichum graminis) occurred generally.

AVENA SATIVA, OATS. Traces of loss were recorded from bacterial blight (Pseudomonas coronafaciens), crown rust (Puccinia coronata), stem rust (Puccinia graminis), and loose and covered smuts (Ustilago avenae and U. kolleri). The generally grown variety Vicland is resistant to both rusts and both smuts.

BROMUS INERMIS, SMOOTH BROME GRASS. Ergot (Claviceps purpurea) was observed in Dane and Waupaca Counties. Bacterial spot (Pseudomonas coronafaciens var. atropurpurea), leaf scald (Rhynchosporium secalis) and leaf spots caused by Helminthosporium bromi, Selenophoma bromigena, and Septoria bromi, were general in distribution.

CENCHRUS PAUCIFLORUS, FIELD SAND BUR. Head smut (Sorosporium syntherismae) was collected in Columbia County in August and September.

HORDEUM VULGARE, BARLEY. Ergot (Claviceps purpurea) was abundant in regions where quack grass was present, and caused a trace of loss. Leaf spot, stem blight, and head blight due to Helminthosporium sativum and H. teres were severe, and the resultant loss is estimated at 5%. Loose smut (Ustilago spp.) caused a loss of 0.5%. Covered smut (U. jensenii), powdery mildew (Erysiphe graminis), and scab (Gibberella zeae) caused only traces of loss. No loss was recorded from stripe (Helminthosporium gramineum), leaf rust (Puccinia anomala), stem rust (Puccinia graminis), or scorch (Rhynchosporium secalis).

LINUM USITATISSIMUM, FLAX. Pasmo (Mycosphaerella linorum) (Sphaerella linorum) caused a trace of loss; none was recorded from other diseases.

MEDICAGO SATIVA, ALFALFA. During a survey in October (PDR 27(21): 566, Oct. 22, 1943) the known range of bacterial wilt (Corynebacterium insidiosum) in the State was extended northward. Indications were that this disease and winter injury were the main conditions responsible for dying out of alfalfa stands after 2 or 3 years.

Of other diseases observed leaf spot (Pseudopeziza medicaginis) was most general, although yellow leaf blotch (Pyrenopeziza medicaginis) was more severe in certain fields. Downy mildew (Peronospora trifoliorum), leaf spot (Pseudoplea briosiana), rust (Uromyces striatus) and yellows (leafhopper injury) were also present.

MELILOTUS spp., SWEETCLOVER. Stem blight and leaf spot (Cercospora meliloti), blight (Mycosphaerella lethalis), downy mildew (Peronospora trifoliorum), and root rot (Phytophthora cactorum) were less prevalent than in 1942.

PHLEUM PRATENSE, TIMOTHY. Brown stripe (Scolecotrichum graminis), stem rust (Puccinia graminis var. phlei-pratensis), and stripe smut (Ustilago striaeformis) were recorded.

POA PRATENSIS, KENTUCKY BLUEGRASS. Claviceps purpurea, Erysiphe graminis, Helminthosporium vagans and Septoria sp. causing leaf spots, rusts due to Puccinia poae-sudeticae and P. rubigo-vera, and stripe smut caused by Ustilago striaeformis occurred in the usual amounts.

SECALE CEREALE, RYE. Traces of loss were recorded from ergot (Claviceps purpurea), anthracnose (Colletotrichum graminicolum), scab (Gibberella zeae), and stalk smut (Urocystis occulta). No loss was caused by either stem rust (Puccinia graminis) or leaf rust (P. rubigo-vera var. secalis).

SETARIA spp., FOXTAIL GRASS. Leaf spot (Piricularia grisea) was noted on both S. lutescens, yellow foxtail grass, and S. viridis, green foxtail grass. Head smut (Ustilago neglecta) occurred on S. lutescens.

SOJA MAX, SOYBEAN. More downy mildew (Peronospora manshurica) was evident than usual. Bacterial blight (Pseudomonas glycinea) caused damage amounting to a trace on the crop cut for hay. Bacterial pustule (Xanthomonas phaseoli var. sojense) occurred in the usual slight importance.

Mosaic (virus) was less prevalent than usual and caused a trace of loss. At least 2 types, a mottling type and a dwarfing type, were evident. Mendota was very resistant, vegetable types generally were susceptible, and Etum was very susceptible.

SORGHUM VULGARE, SORGHUM. Covered smut (Sphacelotheca sorghi) caused a trace of damage.

SORGHUM VULGARE, var. SUDANENSE, SUDAN GRASS. Diseases recorded, all of general occurrence and in the normal amounts, were anthracnose (Colletotrichum graminicolum), leaf blight (Helminthosporium turcicum), bacterial spot (Pseudomonas andropogoni), rust (Puccinia purpurea), and kernel smut (Sphacelotheca sorghi).

TRIFOLIUM spp., CLOVER. Diseases occurred in about average amounts. On red clover, T. pratense, powdery mildew (Erysiphe polygoni), northern anthracnose (Kabatiella caulivora), and black stem (Phoma trifolii) are most important, the last-named being especially severe in late summer and early fall. Minor diseases include leaf spot (Cercospora zebrina), sooty blotch (Cymadothea trifolii), bacterial leaf spot (Pseudomonas syringae) (P. trifoliorum), leaf spot (Stemphylium sarcineaforme), and rust (Uromyces trifolii var. fallens). Stemphylium leaf spot and rust are most prevalent late in the season.

Sooty blotch occurs on white clover, T. repens, as well as red clover.

TRITICUM AESTIVUM, WHEAT. Losses from leaf rust (Puccinia rubigo-vera var. triticina) and stem rust (P. graminis var. tritici) were estimated at 5% and 0.5%, respectively. Foot rot (Helminthosporium sativum), scab (Gibberella zeae), bunt (Tilletia spp.), and loose smut (Ustilago tritici) caused traces of loss.

ZEA MAYS, CORN. Information on diseases of corn was contributed by P. E. Hoppe.

Bacterial wilt (Bacterium stewartii) was of slight importance, as usual.

Ear rots and stalk rots generally were less prevalent than in 1942 or the average year. This was true of ear and stalk rot caused by Diplodia zeae and by Fusarium sp., ear rot caused by Gibberella zeae and by Nigrospora sphaerica, and kernel rot due to Penicillium sp. The low incidence of Fusarium ear rot was associated with minimum damage from ear worm. Dry conditions at the silking period resulted in a minimum amount of ear infection by Gibberella zeae in the southern part of the State.

The seedling blight due to Gibberella zeae was of the usual slight importance.

Incidence of rust (Puccinia sorghi) was average, the disease being generally distributed but causing little damage.

Smut (Ustilago maydis) was less prevalent than usual. Certain sweet corn varieties are more susceptible than others.

Losses from smut were estimated at a trace to 1%; other loss estimates were a trace each from Nigrospora ear rot and Gibberella ear rot.

FRAGARIA spp., STRAWBERRY. Leaf scorch (Diplocarpon earliana), leaf spot (Mycosphaerella fragariae), and blackroot associated with low temperatures occurred generally.

MALUS SYLVESTRIS, APPLE. Crowngall (Agrobacterium tumefaciens) occurred to the usual extent in nurseries.

Fireblight (Erwinia amylovora) infection was favored by the succulent wood growth induced by favorable rains and more occurred than during 1942 or than usual. Wet weather in May and early June also favored the development of apple rust (Gymnosporangium juniperi-virginianae) and scab (Venturia inaequalis) and both were more severe than usual, although not more prevalent than during the preceding year. Scab was the major disease in all orchards. Ascospores were mature on April 28, which is later than usual. The main period of ascospore discharge was from May 24 to June 4, and infection was first noted June 8.

Black rot (Physalospora obtusa) occurred in the usual amounts, mostly in old neglected trees in southern sections.

Dry weather at harvest time resulted in reduced amounts of the minor diseases fly speck (Leptothyrium pomi), blotch (Phyllosticta solitaria), and core mold (Alternaria sp. and Fusarium sp.).

Bitter pit (physiogenic) also was less troublesome than usual.

Frost damage from low temperatures at blossoming time was much less destructive than during 1942; the loss being estimated at a trace. About the average amount of winter-killing occurred.

PRUNUS CERASUS, SOUR CHERRY. Leaf spot (Coccomyces hiemalis) is one of the most important factors affecting production of this important fruit crop in Wisconsin. During 1943 as in the preceding year, weather favored its development and it was more prevalent than usual. The peak of ascospore discharge was reached early, during blossom.

Favorable weather also resulted in above-normal infection by both brown rot fungi, Monilinia laxa and M. fructicola. The presence of M. laxa in Wisconsin, where it was first observed in 1941, has been reported by G. W. Keitt et al. (Phytopath. 33:1212, Dec. 1943). Previously this fungus was not known to occur in this country outside of the Pacific Coast area. Observations so far have been limited to Door County. The spur blight caused by M. laxa was of great importance in some orchards where as many as 75% of the spurs were killed. Early Richmond was more susceptible than Montmorency. M. fructicola occurred locally, primarily as a blossom blight. In some orchards 80% of the blossoms were affected.

Cherry yellows (virus), another disease of major importance in Wisconsin, increased in prevalence over both the preceding year and the average year.

Necrotic ringspot (virus) is reported from Wisconsin for the first time, although it has been recognized as a distinct trouble since about 1934 but not well understood.

An increased amount of winter killing was related to poor leaf spot control in 1942. Some frost damage was noted.

PRUNUS spp., PLUM. Scab (Cladosporium carpophilum) was less prevalent than in both the preceding and the average year. Black knot (Dibotryon morbosum) occurred in normal amounts. Although moisture conditions

early in the season favored brown rot (Monilinia fructicola), later dry weather resulted in no more than average and less than in 1942. Plum pockets (Taphrina pruni) occurred to the usual extent on susceptible americana plums. Bacterial spot on the leaves (Xanthomonas pruni) occurred in scattered locations.

PYRUS COMMUNIS, PEAR. Pears are not a commercial crop in Wisconsin. Fireblight (Erwinia amylovora) and scab (Venturia pyrina) were both more severe than usual.

RIBES GROSSULARIA, GOOSEBERRY. Rust (Cronartium ribicola) occurred as usual; it is important in connection with distribution on white pine. Rust (Puccinia grossulariae) was more prevalent than usual; it occurs locally and is most severe near marsh grass. Anthracnose (Pseudopeziza ribis) and powdery mildew (Sphaerotheca mors-uvae) occurred in the usual amounts.

RIBES SATIVUM, RED CURRANT. Rust (Cronartium ribicola) was scattered in occurrence; it is of slight importance on red currant but serious in connection with infection of white pine. It was also observed on cultivated R. odoratum and R. nigrum, but it has not been observed on R. alpinum nor on Viking currant. Anthracnose (Pseudopeziza ribis) was normal in occurrence.

RUBUS spp., BLACKBERRY. Rust (Gymnoconia peckiana) is the limiting factor in blackberry growing; there was more than usual in 1943. Anthracnose (Elsinoë veneta) also showed an increase in prevalence over normal. Crowngall (Agrobacterium tumefaciens) and mild mosaic (virus) occurred to the usual extent. On wild blackberry sooty blotch (Gloeodes pomigena) and fly speck (Leptothyrium pomi) were noted.

RUBUS spp., DEWBERRY. Anthracnose (Elsinoë veneta) was normal in occurrence.

RUBUS spp., RASPBERRY. On black raspberry, anthracnose (Elsinoë veneta) occurred in average amounts. It was favored by wet weather early in the season but dry weather prevailed from the latter part of June.

On red raspberry, crowngall (Agrobacterium tumefaciens), spur blight (Didymella applanata), anthracnose (Elsinoë veneta), orange rust (Gymnoconia peckiana) (G. interstitialis) were of normal prevalence, as was mosaic (virus).

VACCINIUM spp., CRANBERRY. False blossom (virus) is general in cranberry bogs. Leafhoppers, the insect vector, were more abundant than in 1942 but control with pyrethrum prevented the development of more than the average amount of false blossom, although there was more than in the preceding year. Storage rots due to Penicillium spp. and other fungi were average in occurrence.

VITIS spp., GRAPE. Dry weather at harvest prevented black rot (Guignardia bidwellii) from developing in more than normal amounts, and there was less than last year. Downy mildew (Plasmopara viticola) also was normal in prevalence and less important than in 1942. Wild varieties are susceptible to downy mildew.

DISEASES OF SPECIAL CROPS

BETA VULGARIS, SUGAR BEET. Tip root rot (Aphanomyces sp.) was less prevalent than usual, an occasional rotted beet being observed in a few fields.

Leaf spot (Cercospora beticola) was much less important than usual. It was severe in an occasional field, but in most it occurred in traces or not at all. Dry weather late in the season and cool nights were not conducive to its spread.

Root rot (Phoma betae) was of less importance than usual; traces were observed in scattered fields.

Crown rot due to Rhizoctonia solani and Pythium sp., although more common in occurrence than usual, caused only slight loss. In a few fields damage to the roots was appreciable; elsewhere it amounted to only a trace. Infection of petioles and leaves occurred very generally but damage was light in most fields examined.

Heart rot due to boron deficiency was less troublesome than usual although more was observed than in 1942. The condition appeared very late in the season and became most prevalent in the dry southeastern part of the State east and south of Lake Winnebago. Late rains in most areas were unfavorable to its development.

HELIANTHUS ANNUUS, CULTIVATED SUNFLOWER. Powdery mildew (Erysiphe cichoracearum) occurred to the usual slight extent. Rust (Puccinia helianthi-mollis) was generally less common than last year, except in northern sections with greater rainfall.

NICOTIANA TABACUM, TOBACCO. Information on tobacco diseases was contributed by James Johnson.

Much less blackfire (Pseudomonas angulata) than usual occurred in fields; the disease was conspicuous by its absence except in one section in the vicinity of Rio in Columbia County. It was rare in seedbeds also.

A new outbreak of wildfire (Pseudomonas tabaci) was found this year in the northern tobacco district of the State, on isolated farms in Vernon and Crawford Counties. Infection was heavy in some fields. Recurrent infection was noted in Rock County.

Black root rot (Thielaviopsis basicola) occurred to the same extent as last year, which is less than usual. The loss caused was estimated at 5% from reduction in yield and 10% in grade. The use of resistant varieties is very general.

Damage from mosaic (virus) was less than usual. The disease occurred to some extent in most fields and high percentages of infection were observed in scattered fields. Loss was estimated at 1% from reduction in yield and 2% from lowered quality. Streak (virus) was of slight importance, as usual, although it was generally distributed and more occurred than in 1942. High percentages of infection were noted on the borders of occasional fields.

Potash hunger due to potassium deficiency was less damaging than usual. This trouble is not important in relation to yield but the low potash content reduces quality of the crop.

Brown root rot (cause undetermined) was scattered in distribution. There was a slight increase this year in the use of "sod fields" with resultant brown root rot. As many as 50% affected plants were observed in some fields. The reduction in yield was estimated at 1%.

No frenching (cause undetermined) was seen in 1943.

The crop was generally late in development. The cool wet spring delayed transplanting.

DISEASES OF ORNAMENTALS AND MISCELLANEOUS PLANTS

A comprehensive report on forest tree diseases has been given in the Plant Disease Reporter (28(6):172-180. Mar. 15, 1944).

AGRIMONIA sp. Pucciniastrum agrimoniae, rust, was common in Langlade County in August.

ALTHAEA ROSEA, HOLLYHOCK. Very few specimens of Puccinia malvacearum, rust, were seen in 1943.

AMARANTHUS RETROFLEXUS, PIGWEED. Albugo bliti, white rust and Gloeosporium amaranthicola, anthracnose, were common during August in Green Lake County and elsewhere.

ANTIRRHINUM MAJUS, SNAPDRAGON. Puccinia antirrhini, rust, occurred as usual in greenhouses, and late in the season in most gardens.

ASCLEPIAS SYRIACA, MILKWEED. Yellows caused by the aster yellows virus was observed in Door County.

ASTER MACROPHYLLUS, BROAD-LEAF ASTER. Coleosporium solidaginis, rust, was generally distributed and common in September. Septoria atropurpurea, leaf spot, was common on Madeline Island in Ashland County in September.

CALLISTEPHUS CHINENSIS, CHINA ASTER. A severe infection of Coleosporium solidaginis, rust, was noted in Langlade County. Fusarium oxysporum f. callistephi (F. conglutinans var. callistephi), wilt, was scattered in distribution and less important than usual. Aster yellows (virus) was generally distributed as usual.

CELASTRUS SCANDENS, BITTERSWEET. Ramularia celastri, leaf spot, was common in Columbia County.

CHRYSANTHEMUM sp. An undetermined species of Coleosporium was sent in from Langlade County. Erysiphe cichoracearum, powdery mildew, was more evident than usual.

CONVOLVULUS sp., BINDWEED. Puccinia convolvuli, rust, was general and abundant during August.

CORYLUS CORNUTA, BEAKED HAZEL. Gloeosporium coryli, leaf spot, was scattered in occurrence. It was observed commonly in Wood and Adams Counties.

DAHLIA spp. Mosaic (virus) was scattered in occurrence and less important than usual. Commercial growers pull out infected plants as soon as symptoms are noted.

DELPHINIUM spp., LARKSPUR. Botrytis sp. causing blight was more abundant than usual owing to wet weather early in the season. Infection by Pseudomonas delphinii, black spot, was checked by drought almost as soon as it appeared.

EPILOBIUM ANGUSTIFOLIUM, FIREWEED. Pucciniastrum pustulatum, rust, was common throughout the State. It was noted especially on Madeline Island in Ashland County.

GAULTHERIA PROCUMBENS, WINTERGREEN. Gloeodes pomigena, sooty blotch, and Leptothyrium pomi, fly speck, were general in occurrence.

GLADIOLUS spp. Pseudomonas marginata, scab, and Septoria gladioli, hard rot, were normal in prevalence; scab was generally distributed while hard rot was noted in scattered locations. Xanthomonas gummisudans, bacterial spot, was more prevalent than usual in the local areas where it occurred. Less mosaic (virus) than usually occurs was noted in scattered plantings. A general increase, from the normal amount and from that

noted last year, of whitening due to thrips injury seems to be associated with the reduction in the use of bichloride of mercury for treatment. The better growers will resume the use of bichloride if it can be obtained.

HELIANTHUS sp., WILD SUNFLOWER. Puccinia helianthi, rust, was collected in Marathon and Dane Counties in August.

IMPATIENS BIFLORA, JEWELWEED. Ramularia impatientis, leaf spot, was collected in Columbia County in August.

IRIS spp. Didymellina iridis, leaf spot, occurred in local areas in average amounts, although less than in 1942. Erwinia carotovora, root rot, was scattered in distribution and less important than usual.

LILIUM spp. Botrytis sp. causing blight of regal lily (L. regale) was favored by wet weather and more developed than usual although not more than last year. Mosaic (virus) was not serious.

MENTHA sp., WILD MINT. Puccinia menthae, rust, was collected in Green Lake County in August. Septoria menthicola, leaf spot, was collected in September on Madeline Island in Ashland County.

PAEONIA sp., PEONY. Botrytis sp., blight, occurred to the same extent as in 1942 which was more than usual. Wet weather in the early part of the season favored its development. Dry hot weather later in the season reduced the prevalence of Cladosporium paeoniae, leaf spot, and Erysiphe cichoracearum, powdery mildew. Heterodera marioni, rootknot, was of the usual slight importance in scattered locations.

POLYGONUM sp., SMARTWEED. Ustilago utriculosa, head smut, was collected in Waupaca County in August.

POTENTILIA MONSPELIENSIS, CINQUEFOIL. Ramularia arvensis, leaf spot, was collected in Green Lake County in August.

ROSA spp., ROSE. Agrobacterium tumefaciens, crowngall, was local in distribution, infection being largely confined to greenhouse plants. Diplocarpon rosae, black spot, was of less than normal importance, dry weather at the critical period preventing the usual amount of infection. Phragmidium sp., rust, was scattered in distribution as usual. Wild type rose varieties are susceptible. Sphaerotheca pannosa, powdery mildew, occurred locally in the usual amounts. Rugosa varieties showed resistance; Dorothy Perkins and Paul Scarlet were susceptible.

RUBUS PARVIFLORUS, THIMBLEBERRY. Septoria rubi, leaf spot, was collected on Madeline Island, Ashland County, in September.

SYMPHORICARPOS ALBUS, SNOWBERRY. Glomerella cingulata, anthracnose, was scattered in occurrence and less abundant than usual. Severe fruit and leaf infection by Sphaceloma symphoricarpi, scab, was observed in Waupaca County in August.

* TAGETES spp., MARIGOLD. Yellows (aster virus) was observed in Door County where yellows on asters was quite severe.

TARAXACUM OFFICINALE, DANDELION. Ramularia taraxaci, leaf spot, was common in August. Sphaerotheca humuli var. fuliginea, powdery mildew, occurred generally.

TULIPA sp., TULIP. Botrytis sp., blight, was favored by wet weather in the early part of the season and more occurred than normally. The usual amount, in scattered locations, of breaking due to virus was noted.

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* SYRINGA VULGARIS, LILAC. Microsphaera alni, powdery mildew, was general in distribution and normal in prevalence.

PLANT DISEASE SURVEY IN MINNESOTA[1]

Ian W. Tervet

Of possibly greatest interest in the plant disease situation in Minnesota in 1943 was the development of large pustules of stem rust (Puccinia graminis var. avenae Race 8) on the hitherto resistant oat varieties, Vicland, Tama, etc., that derived their resistance from the Richland variety. If race 8 of P. graminis avenae increases in population in the future, there need be little expectation that the oats of Richland parentage will have any advantage in stem rust resistance over the varieties such as Gopher, hitherto grown in Minnesota. Stem rust was of little importance on wheat and barley. A moderately heavy epidemic of crown rust (Puccinia coronata) caused some reduction in yield but the intensity of the disease was much less than in the heavy epidemic of 1941.

An unusually heavy epidemic of the diseases associated with Helminthosporium sativum and Helmirthosporium spp. occurred on barley. Seedling blight and root rot were general; heavy leaf and stem infections and head blight reduced yields appreciably. Scab (Gibberella zeae) (G. saubinettii) was heaviest in the southern part of the State. The pasmo disease, (Mycosphaerella linorum) (Sphaerella linorum) of flax reached unusual development, the most severe epidemic of this disease being recorded.

Late blight (Phytophthora infestans) on potatoes was less severe than in 1942 but was more prevalent than in most recent years. On rutabagas, leaf spot (Alternaria brassicae) (A. herculea) was common, and many of the roots in storage were infected.

Leaf-infecting pathogens were common on many hosts in 1943, bacterial leaf blight on oats and barley being very conspicuous. Lack of critical and experimental evidence on the losses resulting from most of such infections makes estimations of losses a matter of opinion.

VEGETABLE CROPS

BRASSICA CAMPESTRIS, RUTABAGA. Alternaria brassicae (A. herculea), Alternaria leaf spot and dry rot. Alternaria leaf spot was common in north central section of the State. Dry rot of the roots was seen in warehouses in Beltrami and Pine Counties. Fusarium sp., dry rot, was seen only in one warehouse in Beltrami County. Phoma lingam , black leg, was not abundant and loss was a trace. Loss from Xanthomonas campestris (Bacterium

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[1] The writer acknowledges his indebtedness for the assistance given to him during the course of the survey by E. C. Stakman, J. J. Christensen, M. B. Moore, C. J. Eide, C. M. Christensen, E. G. Sharvelle and Miss L. M. Dosdall of the University of Minnesota.

campestre), black rot, was especially severe in Pine County, about 15% being estimated.

BRASSICA OLERACEA var. CAPITATA, CABBAGE. Fewer reports of Xanthomonas campestris (Bacterium campestre), blackrot, were received in 1943 than in previous years. Loss was a trace, which is average.

Only a trace of Fusarium oxysporum f. conglutinans, yellows, was seen. Most commercial varieties grown are resistant. Phoma lingam, black leg, caused a trace of loss. Plasmodiophora brassicae, clubroot, is present in the principal cabbage regions of the State. Loss of 1% in 1943 is average.

CUCUMIS MELO, CANTALOUP. Only occasional infected plants by Erwinia tracheiphila) (Bacillus tracheiphilus), bacterial wilt, were seen. The estimated loss from Colletotrichum lagenarium, anthracnose, of 2% is about average but is less than for the 2 preceding years. The loss from Fusarium oxysporum f. melonis (F. bulbigenum var. niveum f. 2) is about the same as in previous years. Growers do not grow melons on land known to be infected. Loss from mosaic (virus) was limited to a trace.

CUCUMIS SATIVUS, CUCUMBER. The estimated loss of 1% from Erwinia tracheiphila), bacterial wilt, was about average. An average loss (5%) was estimated from mosaic (virus).

LYCOPERSICON ESCULENTUM, TOMATO. Colletotrichum phomoides, anthracnose, appeared late in the season. Phytophthora infestans, late blight, was much less prevalent than in 1942, only slight loss occurring. Septoria lycopersici, leaf spot, in the 1943 epidemic again was heavy, an estimated loss of 10% resulting.

Catface (non-parasitic) was seen most commonly in the vicinity of the Twin Cities, near Owatonna and Faribault in Southern Minnesota. The high soil moisture levels in the early summer of 1943 favored the development of leaf roll (non-parasitic). Many inquiries were received about this disease, but losses appeared to be slight.

PHASEOLUS VULGARIS, BEAN. Less anthracnose (Colletotrichum lindemuthianum) was seen in 1943 and loss was negligible. Less bacterial blight (due to Pseudomonas spp. and Xanthomonas spp.) developed in 1943 than in the previous year.

PISUM SATIVUM, PEA. Ascochyta blights (Ascochyta pisi, A. pinodella, and Mycosphaerella pinodes), were noted. Very little wilt (Fusarium oxysporum f. pisi race 1) (F. orthoceras var. pisi) was observed, for most varieties grown are resistant. Near wilt (Fusarium oxysporum f. pisi race 2) (F. oxysporum f. 8) has been reported by canning companies as becoming increasingly important. Somewhat less bacterial blight (Pseudomonas pisi) developed than in 1942.

SOLANUM TUBEROSUM, POTATO. The prevalence of Actinomyces scabies, common scab, in 1943 was about average, the disease remaining as one of the major potato problems in the State. A heavy epidemic of Alternaria solani early blight, on the foliage occurred generally throughout the State, being most severe apparently on the lighter soils in the northern part of the Red River Valley. Occasional lots of tubers were heavily infected with tuber rot but loss from this phase of the disease was slight. Rejection of fields for certification was principally because of Corynebacterium sepedonicum, bacterial ring rot, but infection in these fields was light.

Common stock is not infrequently infected but actual loss is light. Erwinia phytophthora (E. carotovora), black leg, was severe. Pellicularia filamentosa, (Corticium solani), black scurf, was less prevalent than usual. While Phytophthora infestans, late blight, was much less important in 1943 than in 1942, it still was more prevalent than in an average year. Loss from late blight was light. Loss from all virus diseases including leaf roll, mosaic, and spindle tuber, was average. Purple top wilt was most prevalent east of the Red River Valley and especially around Grand Rapids.

CEREALS, GRASSES, AND FORAGE CROPS

GRAMINEAE, (VARIOUS GRASSES). Claviceps purpurea, ergot, was found on many grasses throughout the State, commonly on Agropyron repens, and Bromus inermis, and not infrequently on Phleum pratense. Infection was heavier than in recent years.

AVENA SATIVA, OATS

Fusarium spp., Helminthosporium avenae, and other fungi, seedling blight and root rot, were common on oats in 1943 but losses are not known.

Pseudomonas (Phytomonas) coronafaciens, halo blight, was more prevalent in 1943 than in most years, the disease being very common early in the season. No estimate of loss was attempted.

Puccinia coronata, crown rust, occurred in a moderately heavy epidemic in 1943, but losses were much less than in 1941, when the grain was shrivelled from the heavy rust attack. A 3% reduction in yield was estimated. Vicland and Tama were resistant, Gopher and Minrus very susceptible.

Puccinia graminis avenae, stem rust, was more prevalent than in an average year. Vicland, Tama, and Nakota were resistant, although large pustules, indicating susceptibility to rust, were found on oats whose stem-rust resistance was derived from Richland. Gopher was very susceptible.

Ustilago avenae, loose smut, and U. kolleri (U. levis), covered smut. Loss from the smuts remained at the same level as in recent years. Vicland, Tama, and Nakota were resistant, and Gopher susceptible.

BROMUS INERMIS, BROME GRASS

Pseudomonas (Bacterium) coronafaciens var. atropurpurea, chocolate spot, was the most serious disease of brome grass in 1943. Selenophoma bromigena, leaf spot, was much less evident than in recent years.

DACTYLIS GLOMERATA, ORCHARD GRASS

Colletotrichum graminicolum, anthracnose, was less common than in 1942.

HORDEUM VULGARE, BARLEY

Claviceps purpurea, ergot, was common but not important.

Fusarium spp., head blight; seedling blight and root rot;

Gibberella zeae (G. saubinetii), scab; seedling blight and root rot;

Helminthosporium spp., head blight; seedling blight, root rot;

Scab and head blight -- A general infection of scab and head blight reduced yields more than in an average year, the estimated reduction in yield from these diseases being 13%. Loss from scab was heaviest in the

southern half of the State, while head blight, resulting from infection by Helminthosporium sativum, was found more generally throughout the State. Head blight, resulting from infection by Fusarium spp., occurred only in the northern part of the State.

Any attempts to distinguish between the losses to barley from head blight resulting from infection by Gibberella, Helminthosporium, and Fusarium would be purely a matter of conjecture when readings are based on field observations. Accuracy in determining the proportion of blight due to any specific organism can only be obtained by adequate analysis of the seeds for microflora.

Seedling blight and root rot -- Seedling blight and root rot, resulting from the planting of seeds heavily infected with Gibberella zeae, Helminthosporium spp. and Fusarium spp. and Fusarium spp., was more widespread and destructive in 1943 than in most years. Especially good response (in stand and yield) resulted from fungicidal treatment of the seed.

Stem blight and foliage blotch. A very severe epidemic of stem blight and leaf blotch occurred throughout Minnesota in 1943, the disease being much more serious than in previous years. Helminthosporium spp. (particularly H. sativum) were chiefly responsible for the infections. All varieties grown were susceptible. Reduction in yield was estimated to be about 7%.

Helminthosporium gramineum, leaf stripe. Average loss (a trace) from leaf stripe was reported. Barbless and Glabron were resistant, Velvet and Peatland being susceptible.

Puccinia anomala, leaf rust, was general but damage was slight. Barbless and Velvet were susceptible.

Rhynchosporium secalis, scald, was present but apparently did not cause any loss.

Ustilago jensenii, covered smut. Loss from covered smut was recorded as trace. Barbless remained resistant.

Ustilago nuda, loose smut. While loss from loose smut was recorded as trace, the disease appears to becoming more common. Barbless, Velvet, and Glabron were susceptible, Trebi resistant, and Peatland resistant in the field but not when artifically inoculated.

Xanthomonas (Phytomonas) translucens, bacterial blight, was general throughout the State.

LINUM USITATISSIMUM, FLAX

Colletotrichum lini, Helminthosporium spp., Fusarium spp. and Rhizoctonia spp. causing seedling blight and root rot are of moderate importance in Minnesota and loss (estimated at 0.5%) in 1943 was average.

Fusarium oxysporum f. lini, wilt, is now of slight importance in Minnesota, the loss of 1% in 1943 being average. Some of tne newer rust-resistant varieties, such as Viking and Bolley's Golden, are moderately susceptible to wilt.

Melampsora lini, rust, was less severe in 1943 than in many previous years, and was serious only in the northern part of the State. The recently developed variety, Koto, hitherto rust-resistant in field plots, was attacked very severely at the Crookston Station of the University of Minnesota. Other varieties, such as Bolley's Golden and Viking, retained their resistance to rust.

Mysphaerella linorum, pasmo. In 1943, the most severe epidemic of pasmo occurred. While the disease has been recognized for 27 years in the United States, this is the first year that losses from pasmo have been heavy. While the loss unquestionably was heavy, exact figures on the extent of the effect in yield are difficult to obtain. The yellow flaxes suffered more than the brown-seeded varieties, Viking and Bolley's Golden being very susceptible.

POA PRATENSIS, BLUEGRASS

Calonectria graminicola and Typhula itoana, snowmold, was common in the Twin City area on lawns, and was also reported from south-east Minnesota. Loss from this disease was relatively light in 1943, no heavy outbreak having occurred in Minnesota since 1941.

Helminthosporium vagans, leaf spot and crown rot, was common in July and August on lawns in Twin City area, and was seen on specimens submitted from southeastern part of the State. Reports indicated some loss to bluegrass pastures from this disease.

Puccinia poae-sudeticae, leaf rust, was much less prevalent than in the preceding 2 years. None was seen in pastures; it was observed only where bluegrass was uncut.

SECALE CEREALE, RYE

Less Claviceps purpurea, ergot, than usually developed, was seen.

Infection by Puccinia rubigo-vera var. secalis (P. dispersa) was light and no loss is reported.

Rye stem rust, (Puccinia graminis var. secalis) was found only near barberries.

SOJA MAX, SOYBEANS

Pre-emergence damping off and seedling blight due to Pythium sp. and probably other fungi is common on certain vegetable varieties to the extent that it is not possible to get satisfactory stands of some varieties, including Etum, Giant Green and some others, at University Farm, St. Paul. Other vegetable varieties, including Bansei and Chusei, have given good stands. Most oil and hay types are relatively resistant to seed decay.

While Xanthomonas phaseoli var sojense, bacterial pustule, is common, it did not cause any appreciable loss in 1943 and was much less destructive than in 1942.

Mosaic (virus) was most common in vegetable varieties.

SORGHUM VULGARE var. SUDANENSE, SUDAN GRASS

Pseudomonas holci, bacterial spot, occurred in most sudan grass fields but no apparent loss resulted.

TRITICUM AESTIVUM, WHEAT

Alternaria sp., Helminthosporium spp., and bacteria, black point, was most common and injurious on durum varieties and was as prevalent as in previous years.

While loss from Claviceps purpurea, ergot, did not exceed a trace, infection was not uncommon. Thatcher in the common wheats and Mindum in the

durums were the most susceptible of the commonly grown varieties.

Gibberella zeae (G. saubinetii), scab was very destructive in the corn area, from central Minnesota south, a 10% reduction in yield occurring. Thatcher and Mindum were very susceptible, and Minturki was the most resistant wheat.

Over much of the State, environmental conditions in the spring were unfavorable for good root development, with the result that seedling blight and root rot due to Helminthosporium spp., Fusarium spp., and other Fungi Imperfecti, were more severe than in an average year. A reduction in yield of 5% was estimated.

Puccinia graminis var. tritici, stem rust, caused very little loss, most of the wheat varieties grown being resistant.

Infection by Puccinia rubigo-vera var. tritici (P. triticina), leaf rust, was on about the same level as in most recent years, a reduction in yield of 5% resulting. Thatcher was very susceptible, and Rival and Mindum the most resistant.

Scattered infections of Septoria tritici, leaf blotch, were seen. The disease was common at the wheat breeding nursery at Waseca in south-east Minnesota, marked differences in the susceptibility of different lines of wheat being observed.

Infection by Tilletia foetida (T. levis) and Tilletia caries (T. tritici) bunt, remained on the same level as in recent years, a trace of loss being reported.

Very little Ustilago tritici, loose smut, was seen.

Xanthomonas translucens var. undulosa . black chaff, was not uncommon.

ZEA MAYS, CORN

Diplodia zeae and Fusarium spp. and other Fungi Imperfecti, stalk rot, ear rot, seedling blight and root rot. Stalk rot was somewhat more severe than in 1942, a loss in yield of about 2% resulting. Infection was general and marked differences in the amount of disease in different fields was observed. Much of the loss in yield resulted from stalk breakage.

Very little ear rot developed, loss being less than in an average year.

The poor seed crop of 1942 gave poor stands and weak plants in 1943. The estimated loss of 10% reduction in yield is much higher than is normally found in Minnesota. Seed treatment resulted in marked improvement in the stand and vigor of the plants.

The 2% loss in yield from Ustilago maydis (U. zeae), corn smut, represents an average loss for Minnesota. Many of the new hybrids are more resistant than old hybrids or standard varieties.

FRUIT CROPS

FRAGARIA spp., CULTIVATED STRAWBERRY. Dendrophoma obscurans, leaf scorch, caused no loss. Fusarium spp., Rhizoctonia sp. and probably other fungi, root rot, is most usually associated with winter injury making any estimate of loss difficult. Mycosphaerella fragariae, leaf spot, was somewhat more common in 1943, but loss was negligible.

MALUS SYLVESTRIS, APPLE. Erwinia amylovora, fireblight, was very prevalent in home orchards on Wealthy but of minor importance in commercial plantings.

Gymnosporangium juniperi-virginianae, apple-cedar rust, in a heavier than average attack caused much disfigured fruit in Hennepin and Ramsey Counties.

Venturia inaequalis, scab, affected almost all fruits in many unsprayed orchards, and many fruits in some well-sprayed orchards. The epidemic was rather more severe than in most years.

A fruit russetting, which always occurs to some extent on Haralson, was very prevalent on that variety in 1943.

PRUNUS spp., PLUMS AND CHERRY-PLUM HYBRIDS. Coccomyces hiemalis, leaf spot, is common on plums and cherry-plum hybrids. The disease appears in late July or August, causing some defoliation.

A heavier than average epidemic of brown rot blossom blight due to Monilinia (Sclerotinia) fructicola, caused severe injury to the plum-cherry variety Oka and to sand cherries in 1943.

RIBES sp., CURRANT. Sphaerotheca mors-uvae, powdery mildew, was severe on the Red Lake variety of currants in nursery stock in Southern Minnesota.

RUBUS spp., RASPBERRY. Elsinoë veneta, anthracnose, was somewhat more prevalent than usual. Sphaerulina rubi, leaf spot, was more prevalent in 1943 than in recent years. Loss from mosaic (virus) is light, most new plantings being relatively free from this disease.

MISCELLANEOUS HOSTS

BETA VULGARIS, SUGAR BEETS. Aphanomyces cochlioides, damping-off and root rot of sugar beets continues to spread in the beet area of southern Minnesota, and already is, or is becoming, a serious hazard in the production of sugar beets in McLeod, Sibley, Blue Earth, Waseca, and Faribault Counties. In Blue Earth County, 400 acres of beets were severely injured, with a probable reduction in yield of 40%.

Cercospora beticola, leaf spot, was found in all sugar beet areas of the State but did damage only in the southern beet area. Infection in the Red River Valley was light and late.

Damping off as a result of infection by Phoma betae is rarely seen.

Loss from Rhizoctonia solani causing damping-off and root rot is slight.

DELPHINIUM sp. Pseudomonas (Bacterium) delphinii, leaf spot, was reported once in 1943.

GAILLARDIA sp. Entyloma polysporum, white smut, was reported once in 1943, in the same city park in which the disease was found in 1942.

HEDERA sp., IVY. Oedema (cause unknown) was reported once in 1943; tiny galls, very numerous and conspicuous developed on a house plant.

IRIS sp. Heavy infections by Bacterium tardicresens, bacterial leaf blight occurred on some varieties and this disease is becoming troublesome in nurseries. Botrytis convoluta, Botrytis rhizome rot, was observed only in St. Paul area, with slight damage to the rhizomes. Very little Heterosporium gracile, leaf spot, was seen in the St. Paul area.

LILIUM spp. Very little blight caused by Phytophthora sp. developed in 1943 compared with the heavy epidemic of previous years. Lilium regale and L. tenuifolium are the most susceptible species.

PAEONIA sp. Very little Botrytis paeoniae, blight, developed in St. Paul area compared with the heavier infection in 1942. Occasional infections by Phytophthora sp, causing blight, were reported.

PETUNIA sp. One report was received of a house plant infected by Oidium sp., powdery mildew.

PINUS RESINOSA, RED PINE. Ten percent of an 8-year old stand of red pine planted in an area of Red Lake Indian Reservation, Beltrami County, was dying of root rot. Site and soil was said to be very good. The root systems were very small and entirely parasitised by Armillaria mellea. A similar dying of red pine was reported by the Soil Conservation Service from their nursery at Winona.

ROSA sp. Fewer reports of Phragmidium speciosum, rust, were received than in recent years.

SYRINGA VULGARIS, LILAC. Phytophthora sp., blight, was reported once in 1943.

SUMMARY OF PLANT DISEASES OBSERVED IN IOWA DURING 1943

T. W. Bretz

The following summary of estimates on the plant disease losses in Iowa for the year 1943 is based principally upon the information provided by the various State and Federal pathologists working in this territory. Owing to the rather late start of the Emergency Plant Disease Prevention Project, this summary would not be possible without the willing assistance of these men and the writer is duly grateful for their help. It should be borne in mind that this report is, of necessity, a record of the final crop loss estimates for the State as a whole and does not contain the trend of the plant disease situation during the growing season, nor the relative severity of the various diseases in different sections of the State.

The weather during the growing season was unusual in several respects. Whereas the precipitation and temperatures during April were about normal, May was unusually wet and the temperatures were below the average. The remaining months were characterized by precipitation and temperatures slightly above average. These conditions are perhaps reflected to some extent in the increased destructiveness of the root necrosis pathogens, as well as in certain other instances in which diseases were noticeably more serious than during the past few years.

VEGETABLE DISEASES

ALLIUM CEPA, ONION

Erwinia carotovora, soft rot, and Pseudomonas alliicola (thought to be the causal agent of the "undetermined neck rock" reported from Iowa in PDR Vol. 27, No. 16, p. 337, 1943) were estimated to have accounted for a combined loss of 25% of the crop. It is difficult to determine the extent of the losses caused by these organisms individually, since P. alliicola field

infection is commonly followed by the soft rot bacterium under storage conditions.

Urocystis cepulae, smut, varied in importance in different localities, but for the entire crop, was responsible for no more than a trace of damage.

APIUM GRAVEOLENS, CELERY

It was estimated that 20% of the celery grown in Iowa was lost due to the prevalence of 2 leaf spots, Cercospora apii (early blight), accounting for 10% loss, and Septoria apii (late blight) account for 10%, loss.

ASPARAGUS OFFICINALIS, ASPARAGUS

Puccinia asparagi, rust, was the only disease of importance observed during the season; it caused an estimated 2% reduction in yield.

BRASSICA OLERACEA var. CAPITATA, CABBAGE

No excessive losses due to disease were reported for this crop.

Alternaria circinans (leaf spot), Erwinia carotovora (soft rot), Fusarium conglutinans (yellows), Pellicularia filamentosa (Corticium vagum) (wire stem), Peronospora parasitica (downy mildew), Phoma lingam (blackleg) and Plasmodiophora brassicae (club root), were each responsible for a trace of damage.

Pythium spp., damping-off, was estimated to have been responsible for a 2% loss.

Xanthomonas campestris, black rot, accounted for the greatest loss, an estimated 5%.

CITRULLUS VULGARIS, WATERMELON

Colletotrichum lagenarium, anthracnose, was the most serious disease of watermelons this past season. Premature death of the vines due to foliage infection, plus fruit infection, accounted for an estimated 25% loss of the crop.

Fusarium oxysporum f. niveum, wilt, was held in check by the use of wilt-resistant varieties, but was responsible for a 5% loss.

Pythium acanthicum, blossom-end rot, caused an estimated 2% reduction in yield.

Pythium spp., damping-off, reduced the yield approximately 5% by decreasing the stand.

Mosaic, (virus), was responsible for a trace of damage.

CUCUMIS MELO, CANTALOUP

Alternaria cucumerina (Macrosporium cucumerimum), leaf blight, was severe and caused an estimated 5% reduction in yield.

Colletotrichum lagenarium, anthracnose, as with watermelon, was responsible for the greatest loss in cantaloups. Leaf infection, which caused an early death of the vines, as well as fruit infection, reduced the crop 20%.

Erwinia tracheiphila, bacterial wilt, resulted in a 5% loss.

Fusarium oxysporum f. melonis (F. bulbigenum var. niveum f. 2), wilt resulted in a 5% loss.

Pythium spp., damping-off, through its effect on stand, reduced the crop approximately 3%.

Mosaic (virus) accounted for a trace in reduction in yield.

DAUCUS CAROTA, CARROT

Erwinia carotovora, soft rot, was estimated to have caused a 5% loss in yield.

Xanthomonas carotae, bacterial spot, was observed but considered to be of minor importance, causing a trace of damage.

IPOMOEA BATATAS, SWEETPOTATO

Endoconidiophora (Ceratostomella) fimbriata, black rot, was considered to be a disease of minor importance and caused an estimated loss amounting to a trace of the crop.

Fusarium oxysporum f. batatas (F. batatatis and F. hyperoxysporum), stem rot (wilt), continued to be the major disease in the field as in former years, causing an estimated 10% loss.

Fusarium oxysporum (surface rot) and Pythium ultimum (mottle necrosis) each accounted for a trace of damage.

Rhizopus nigricans, soft rot and ring rot, was the most important disease in storage, accounting for a 15% loss.

Internal breakdown, physiological, accounted for a loss amounting to a trace of the harvested crop.

LYCOPERSICON ESCULENTUM, TOMATO

Alternaria solani, early blight, was prevalent in most plantings to a rather limited extent and was estimated to have accounted for a trace of damage.

Fusarium oxysporum f. lycopersici (F. bulbigenum var. lycopersici), wilt. The increased use of wilt-resistant varieties tended to keep down the losses from this disease, estimated to be 1%.

Phytophthora infestans, late blight, was observed in a few isolated plantings late in the season, but caused no appreciable loss. A trace of damage was reported.

Septoria lycopersici, blight, was the most prevalent and serious disease of tomatoes, resulting in much defoliation by late summer. In many instances the disease did not become well established, however, until after the fruit had set and was maturing. The loss due directly to this disease was estimated at 10%.

Xanthomonas vesicatoria, bacterial spot, was present in most of the commercial tomato acreages but caused relatively little loss, an estimated 0.5%.

Fruit rots, were caused by miscellaneous fungi and bacteria, following injuries to the fruit. Sunscald, resulting from defoliation due to Septoria blight, was undoubtedly an important forerunner of much of this decay. At least 25% of the fruits rotted in the fields.

Mosaic (virus) was reported from various parts of the State, but in no instance was it particularly serious. An estimated 2% loss was attributed to it.

Blossom end rot, physiogenic, was prevalent early in the season on the

fruit of the first clusters set, but considering the entire season it was not a serious problem, causing a 1% reduction in yield.

PHASEOLUS VULGARIS, BEAN

Colletotrichum lindemuthianum, anthracnose, was the most prevalent and destructive disease of beans, reducing the yield an estimated 10%.

Uromyces phaseoli, rust, was of minor importance, causing only a trace of damage.

Xanthomonas phaseoli, bacterial blight, was prevalent and serious in some plantings, causing an average reduction in yield of 5%.

Mosaic (virus) was common but not a serious problem, accounting for an estimated 1% loss.

PISUM SATIVUM, PEA

Except for the root rots, the pea was not affected by any disease to a serious degree.

Aphanomyces sp., Fusarium sp., Pythium sp., and Rhizoctonia solani, as well as other pathogens causing root rot, were estimated to have caused a 5% loss in the pea crop.

SOLANUM TUBEROSUM, POTATO

An estimated 46.7% of the potato crop was lost due to diseases.

Actinomyces scabies, scab, was responsible for a 10% reduction in yield. Its severity varied from field to field. Some fields were practically scab-free; in others practically all tubers showed scab lesions.

Alternaria solani, early blight, was observed to a limited extent in most of the potato acreages but was of minor importance, causing a trace of damage.

Erwinia phytophthora (E. carotovora), black leg, did not appear to be of major importance, accounting for 0.5% loss.

Fusarium solani f. eumartii, Fusarium wilt, was observed affecting an occasional plant, causing a trace of damage.

Phytophthora infestans, late blight, again occurred in epiphytotic proportions on the muck-land potatoes in northern Iowa. The severity of the outbreak depended to a great extent upon the effectiveness with which the fields were protected by means of spraying. Fields that were well sprayed showed little loss, but poorly sprayed or unsprayed fields in many instances showed as much as 50% reduction in yield. For the State, including all situations, it was estimated that the loss amounted to 16% of the crop.

Rhizoctonia solani, black scurf, varied greatly in severity from field to field. An estimated 6% loss was attributed to it, somewhat more than last season.

Seed piece decay, various organisms responsible, caused an estimated loss of 1%.

Leaf roll (virus) was fairly common and caused an estimated 2% loss.

Mosaic (virus) was thought to have reduced the yield 2%.

Spindle tuber (virus) was fairly prevalent and caused an estimated reduction in yield amounting to 3%.

Other viruses probably reduced the yield an additional 2%. Tipburn and

hopperburn were general and in some fields destructive, causing an average loss estimated at 4%.

DISEASES OF CEREALS, GRASSES, AND FORAGE CROPS

AVENA SATIVA, OATS

The estimated losses in the oat crop due to all diseases amounted to 33.2%, distributed as follows:

Fusarium sp., foot rot, 1%.

Gibberella zeae (G. saubinettii), scab, a trace.

Helminthosporium avenae, leaf spot, a trace.

Pseudomonas coronafaciens, halo blight, 1.5%.

Pythium spp., root necrosis, 10%. This is somewhat higher than in previous years and is probably accounted for by the favorable conditions for development of Pythium early in the season.

Puccinia coronata, crown rust, 10%. This was a favorable season for rust development, which accounts for a higher loss than was experienced the preceding season, despite the greater use of the available rust-resistant oat varieties (Boone, Tama, Control, and Marion).

Puccinia graminis var. avenae, stem rust, 5%, which is considerably more than in previous years.

Ustilago avenae, loose smut, 1.5%, a reduction as compared with previous years, probably accounted for by the wider use of the new oat varieties which are somewhat smut-resistant.

Ustilago kolleri (U. levis), covered smut, 0.5%.

Blast, physiological, 0.5%.

Leaf spot, physiological (?), 3%.

BROMUS spp., BROMEGRASS

The yield of bromegrass was reduced an estimated 42.7% because of disease.

Claviceps purpurea, ergot, accounted for 1% of this loss.

Pseudomonas coronafaciens var. atropurpurea, bacterial spot, reduced the yield an estimated 1.5%.

Puccinia graminis, stem rust, caused a trace of damage.

Pythium spp., root necrosis, accounted for the greatest reduction in an estimated 33%.

Stagnospora sp., purple leaf spot, was estimated to be responsible for a 5% loss.

Xanthomonas translucens, bacterial streak, was responsible for a 3% loss.

Phyllody, (cause ?), caused a trace of damage.

HORDEUM VULGARE, BARLEY

Diseases were estimated to have reduced the yield of barley 40.9% in spite of an otherwise favorable season for this crop.

Claviceps purpurea, ergot, was more prevalent than in the past and accounted for a trace of damage.

Erysiphe graminis var. hordei, powdery mildew, was observed but considered to be of minor importance, the loss resulting amounting to a trace.

Gibberella zeae (G. saubinettii), scab, was somewhat more prevalent than in the preceding 3 years, causing an estimated 3% reduction in yield.

Helminthosporium gramineum, stripe, as in former seasons, was present but accounted for only a trace of damage.

Helminthosporium sativum, spot blotch, was an exceptionally serious problem and including the seedling blight phase of this disease, was estimated to have reduced the yield 25%. Extremely heavy nodal infection was observed, resulting in the death of the leaf sheaths before the plant was in the boot stage of development.

Helminthosporium teres, net blotch, was observed and estimated to have resulted in a loss amounting to a trace of the crop.

Helminthosporium sp., Fusarium sp. and Ophiobolus sp., foot rots, appeared to be of less importance than in former years, accounting for a 0.2% reduction in yield.

Puccinia anomala, leaf rust, was estimated to have reduced the yield 1%.

Puccinia graminis, stem rust, reduced the yield an estimated 0.5%.

Puccinia rubigo-vera var. tritsici (P. triticina), wheat leaf rust, was of negligible importance on barley reducing the yield a trace.

Pythium spp., root necrosis, favored by the weather conditions, was estimated to have accounted for a loss of 8%.

Ustilago intermedia, intermediate smut, was somewhat more common and reduced the yield approximately 0.5%.

Ustilago jensenii (U. hordei), covered smut, was the least prevalent of the smuts and caused a reduction in yield amounting to a trace.

Ustilago nuda, loose smut, was the most serious of the smuts and accounted for an estimated 2% reduction in yield.

Xanthomonas translucens, bacterial blight, was considered to be of minor importance, the loss resulting from this disease amounting to a trace.

LINUM USITATISSIMUM, FLAX

Diseases accounted for an approximate reduction in yield amounting to one-third of the crop.

Colletotrichum linicola, anthracnose, accounted for a trace of damage.

Fusarium oxysporum f. lini, wilt, was of relatively little importance as a result of the wide use of the wilt-resistant varieties. An estimated 1% loss was attributed to this disease.

Melampsora lini, rust, was estimated to have caused a 0.5% loss.

Mycosphaerella (Sphaerella) linorum, pasmo, was prevalent and moderately severe, causing a 5% loss.

Pythium spp., causing root necrosis and damping-off, was the most serious disease problem and accounted for the greatest loss, an estimated 25%.

MEDICAGO SATIVA, ALFALFA

It was estimated that the yield of alfalfa was reduced about one-third as a result of the prevalence of certain diseases.

Cercospora medicaginis, leaf spot, was common and accounted for an estimated 1% loss.

Corynebacterium insidiosum, wilt, was the most destructive disease observed, accounting for a 20% reduction in yield.

Peronospora trifoliorum, downy mildew, was considered to be of minor importance, causing a trace of damage.

Pseudopeziza medicaginis, leaf spot, was common and severe, causing an estimated 6% loss.

Pyrenopeziza medicaginis, yellow leaf blotch, was estimated to have reduced the yield 4%.

Uromyces striatus, rust, was observed but was considered to be of minor importance, causing a trace of damage.

PHLEUM PRATENSE, TIMOTHY

Puccinia graminis var. phlei-pratensis, stem rust, was considered to be of minor importance, causing a loss amounting to a trace of the crop.

Scolecotrichum graminis, leaf stripe, was the most prevalent and destructive of the timothy diseases, causing an estimated 1% loss.

Ustilago striaeformis, stripe smut, was of minor importance, accounting for a trace of damage.

Xanthomonas translucens var. x, bacterial leaf spot, was observed and estimated to have accounted for a trace of damage.

POA PRATENSIS, BLUEGRASS

Erysiphe graminis, powdery mildew, was responsible for a trace of damage.

Puccinia graminis, stem rust, caused an estimated 1% loss.

Septoria macropodia, leaf spot, caused a trace of damage.

SECALE CEREALE, RYE

This crop appeared to be relatively free of destructive diseases.

Claviceps purpurea, ergot, was more prevalent than in former years, causing an estimated 1% loss.

Puccinia rubigo-vera var. secalis (P. dispersa), leaf rust, was prevalent and accounted for a 2% reduction in yield.

Puccinia graminis, stem rust, was of minor importance, a trace of damage being reported.

Ustilago sp., smut, caused a trace or damage.

Xanthomonas translucens var. secalis, bacterial blight, was observed but considered to be of minor importance, causing a trace of damage.

SOJA MAX, SOYBEAN

Diaporthe sojae, pod and stem blight, was reported from all sections of the State and was present in a high percentage of the fields, but the actual damage caused by this disease was estimated not to exceed 0.5%.

Glomerella glycines, anthracnose, was found in all sections of Iowa but in relatively few fields, usually occurring on plants affected by some other disease and in a poor state of vigor. Only a trace of damage was attributed to this organism.

Peronospora manshurica, downy mildew, appeared rather late in the growing season in a limited number of fields and probably affected the yield to a negligible extent. A trace of damage was recorded.

Pseudomonas glycinea, bacterial blight, was prevalent in practically all fields. The amount of leaf area involved by the lesions was relatively small, however, and the disease was thought to have reduced the yield an estimated 0.5%.

Pythium spp., root necrosis, was probably responsible for a limited reduction in stand, but owing to the thick seeding practiced in planting this crop, the loss was largely compensated for by the increased vigor of the remaining plants. An estimated loss of 1% was attributed to this disease.

Rhizoctonia solani, damping-off. As in the case of root necrosis, the loss in stand due to this disease was not necessarily reflected in a corresponding decrease in yield, and a 1% reduction in yield was recorded.

Septoria glycines, Septoria leaf spot, was observed early in the growing season but did not persist as an important factor in limiting yield, being responsible for an estimated 0.5% reduction.

Xanthomonas phaseoli var. sojense, bacterial pustule. This undoubtedly was the most prevalent and serious disease of soybeans. It was observed in all fields in every section of the State, causing much leaf spotting and some defoliation. It was estimated to have caused a loss in yield amounting to 2%.

Bud blight was widely distributed throughout the State. The percentage of plants affected in individual fields varied from a trace to 100% and the severity of the disease was correspondingly varied. Relatively few fields were observed in which there was a serious reduction in yield and for the State the loss did not exceed 1%.

Mosaic (virus) was observed in a relatively small percentage of the fields and in only a few instances did it appear that there was a marked reduction in yield resulting. A loss to the extent of a trace was recorded for this disease.

The late planted fields and fields planted to late-maturing varieties were hit by frost, particularly in the northern counties, before the crop was fully matured, resulting in an estimated 2% reduction in yield.

SORGHUM VULGARE, SORGHUM

Pseudomonas holci, bacterial spot, was common but of minor importance, causing a trace of damage.

Sphacelotheca sorghi and S. cruenta, kernel smuts, accounted for an estimated 1% reduction in yield.

TRIFOLIUM PRATENSE, RED CLOVER

Erysiphe polygoni and Cymadothea trifolii, powdery mildew and sooty mold, respectively, each accounted for a trace of damage.

Pseudomonas syringae (P. trifoliorum), Pseudopeziza trifolii, and Stagonospora sp., the leaf spotting organisms, caused a combined loss estimated at 3%.

Mosaic (virus) was responsible for a trace of damage.

TRITICUM AESTIVUM, WHEAT

Gibberella zeae (G. saubinetii), scab, was unusually severe on winter wheat, causing a 12.5% reduction in yield. It was less destructive than last season on the spring wheat, however, causing a 5% loss.

Puccinia graminis var. tritici, stem rust, although somewhat more prevalent than last year, was not particularly serious except in localized areas, causing loss ranging from a trace to 25%. It was estimated to have reduced the average yield of winter wheat 3%, and of spring wheat only a trace.

Puccinia rubigo-vera var. tritici (P. triticina), leaf rust, was the most destructive disease observed and was somewhat more severe than usual on the winter wheat, causing a 10% loss. It appeared to be less serious than last season on the spring wheat, reducing the yield 15%.

Pythium spp., root necrosis, was somewhat more prevalent and serious than in previous seasons, causing an estimated 10% loss in the winter wheat crop.

Septoria tritici, speckled leaf blotch, was of minor importance, causing a 1% loss in the winter wheat and a trace of damage in the spring wheat.

Tilletia foetida (T. laevis) and T. caries (T. tritici), bunt, caused a trace of damage.

Ustilago tritici, loose smut, appeared to be no more destructive than in former years, accounting for a 2% and a 0.5% reduction in yield in the winter and spring wheats, respectively.

Xanthomonas translucens var. undulosa , black chaff, was observed on winter wheat but was considered to be responsible for only a trace of damage.

ZEA MAYS var. IDENTATA, FIELD CORN

Much of the corn was subject to very unfavorable weather early in the season, which was reflected to some extent by a general increase in the amount of root necrosis due to various pathogens. The other diseases were not noticeably more serious than in previous seasons, except for an increased prevalence of Gibberella ear rot.

Cephalosporium acremonium, black bundle, was observed and caused a trace of damage.

Diplodia zeae, root necrosis, was prevalent and caused a 2% loss. The dry rot phase of the disease accounted for an estimated 5% reduction in yield.

Fusarium spp., dry rot, was prevalent, particularly following corn earworm damage, but was considered to have caused only a trace of damage.

Gibberella zeae (G. saubinetii), caused an estimated 5.6% loss. The root necrosis phase of the disease accounted for a 2% reduction; the stalk rot phase 1% and the dry rot of ears, 2.6%.

Nigrospora oryzae, dry rot of ears, was prevalent, particularly on secondary ears, but was of minor importance on primary ears, causing an estimated 0.5% loss.

Puccinia sorghi, leaf rust, was common in all sections of the State but in no instance did it occur in destructive proportions. A trace of damage was reported.

Pythium spp., root necrosis, was prevalent and destructive, causing an estimated 10% reduction in yield.

Ustilago zeae, smut, was prevalent in all fields in varying amounts, causing an average decrease in yield estimated at 3%.

ZEA MAYS var. RUGOSA, SWEET CORN

Bacterium stewarti, bacterial wilt, was of minor importance, causing a trace of damage.

Diplodia zeae, stalk rot, was generally prevalent and destructive, causing an estimated 5% loss.

Puccinia sorghi, rust, was prevalent but caused only a trace of damage.

Ustilago zeae, smut, was the most destructive disease observed, accounting for an estimated 8% reduction in yield.

FRUIT DISEASES

AMYGDALUS PERSICA, PEACH

Owing to the lack of adequate means of applying protectants in the farm and home orchards, combined with the favorable weather conditions for disease development, the losses are somewhat higher than in previous years.

Cladosporium carpophilum, scab, was generally prevalent and reduced the yield an estimated 3%.

Monilinia (Sclerotinia) fructicola, brown rot, was the most serious disease problem encountered and caused an estimated 15% reduction in yield.

Sphaerotheca pannosa var. persicae, powdery mildew, was observed but considered to be of minor importance, causing a trace of damage.

Taphrina deformans, leaf curl, appeared to be somewhat more pronounced this season than last, reducing the yield an estimated 2%.

Xanthomonas pruni, bacterial blight, was quite destructive, causing an estimated 5% loss.

FRAGARIA, STRAWBERRY

Botrytis sp., Phytophthora cactorum, and Rhizoctonia sp., causing field fruit rots, were prevalent and accounted for the greatest disease loss, an estimated 10%.

Mycosphaerella fragariae, leaf spot, was also more prevalent than in previous years and reduced the yield an estimated 4%.

Sclerotinia sclerotiorum, crown rot, was of minor importance, accounting for 0.5% loss.

Mosaic, virus (?), (thought to be different from June yellows) has been observed, but was considered to be of minor importance and responsible for only a trace of damage. The late spring freezes were estimated to be responsible for a 10% loss in yield.

MALUS SYLVESTRIS, APPLE

Approximately one-third of the apple crop was estimated to have been destroyed by diseases the past season. Most of this loss occurred in the farm and home orchards where adequate protection from disease was not practicable.

Erwinia amylovora, fire blight, was generally prevalent in all plantings and caused an estimated 2% loss.

Gloedes pomigena, sooty blotch, was of rather minor importance and reduced the yield about 0.5%.

Glomerella cingulata, bitter rot, was not common and accounted for only a trace of damage.

Gymnosporangium juniperi-virginianae, cedar-apple rust, was common on the susceptible varieties and caused an estimated 2% reduction in yield.

Nummularia discreta, blister canker, was not serious, causing an estimated 0.5% loss.

Phyllosticta solitaria, blotch, was not generally prevalent and caused only a trace of damage.

Physalospora obtusa, black rot, was somewhat more serious than in previous seasons and accounted for a 4% reduction in yield.

Venturia inaequalis, scab, was the most destructive disease, especially in unsprayed or poorly sprayed orchards, causing a loss estimated at 15%.

Winter injury was estimated to have reduced the yield 10%.

PRUNUS spp., CHERRY

Owing to the fact that few cherries are grown commercially in this State and that farm and home orchards are generally not adequately protected from disease, the losses from controllable diseases are rather high.

Coccomyces hiemalis, leaf spot, was the most destructive disease, accounting for much early defoliation. It was estimated to have reduced the yield 20%.

Podosphaera oxyacanthae, powdery mildew, was more prevalent and destructive than in previous seasons, accounting for an estimated 10% loss.

Monilinia (Sclerotinia) fructicola, brown rot, appeared to be less serious than in former years, causing a 1% reduction in yield.

The late spring freezes were of importance in reducing the set of fruit and accounted for an estimated 10% loss.

PRUNUS spp., PLUM

Dibotryon morbosum, black knot, was observed but was of minor importance, causing a trace of damage.

Monilinia (Sclerotinia) fructicola, brown rot, was generally prevalent and a serious problem, accounting for an estimated 10% reduction in yield.

Taphrina pruni, plum pockets, was estimated to have reduced the yield 1%.

Xanthomonas pruni, bacterial blight, was prevalent and serious, caus- a 10% loss.

RIBES spp., CURRANT AND GOOSEBERRY

Cercospora angulata, leaf spot, was prevalent and caused an estimated 2% loss.

Cronartium ribicola, European currant rust, was present in scattered localities, accounting for a trace of damage.

Mycosphaerella grossulariae, leaf spot, was generally distributed and caused a 2% loss.

Puccinia grossulariae, cluster-cup rust, was observed in scattered locations, causing a trace of damage.

Sphaerotheca mors-uvae, powdery mildew, was prevalent and accounted for an estimated 2% loss.

RUBUS spp., RASPBERRY

Agrobacterium tumefaciens, crown gall, was present in some plantings and accounted for a 1% loss.

Elsinoë veneta, anthracnose, was the most prevalent and destructive fungous disease observed, in some instances destroying practically the entire stand. For the State it was estimated to have caused a 7% loss.

Gymnoconia peckiana (G. interstitialis), orange rust, caused a loss estimated at 1%.

Leptosphaeria coniothyrium, cane blight, was generally distributed, accounting for an estimated 3% loss.

Mycosphaerella rubina, leaf spot, was general but not serious, causing only a trace of damage.

Septoria rubi, leaf spot, was common and accounted for a 3% reduction in yield.

Winter injury was estimated to have caused a 1% loss.

Mosaic, (virus), was prevalent and destructive, accounting for an estimated 7% reduction in yield.

VITIS spp., GRAPE

Owing to the difficulty in keeping the vines adequately protected because of the frequent precipitation, the losses in this crop were considerably greater than in previous years.

Guignardia bidwellii, black rot, and Plasmopora viticola, downy mildew, were each estimated to have caused a 5% loss.

The late spring freezes were thought to have reduced the yield an additional 5%.

DISEASES OF MISCELLANEOUS HOSTS

BETA VULGARIS, SUGAR BEET. Disease losses accounted for 45.4% of the crop.

Actinomyces scabies, scab, was responsible for only a trace of damage.

Aphanomyces cochlioides, root rot, favored by soil conditions conducive to its development, caused an estimated reduction in yield amounting to 20%.

Cercospora beticola, leaf spot, was favored by the moist weather and accounted for a 12% loss of the crop, somewhat higher than in previous seasons.

Phoma betae, root rot and leaf spot, each accounted for a trace of damage.

Pythium spp., damping off, was estimated to be responsible for a 10% loss, somewhat above the average of past seasons.

Rhizoctonia solani, root rot, was more severe than usual, causing an estimated 3% loss.

Savoy disease (virus) accounted for a trace of damage.

HELIANTHUS ANNUUS, SUNFLOWER. Erisyphe cichoracearum (powdery mildew) and Puccinia helianthi (rust), were generally prevalent and each accounted for an estimated 2% loss.

JUNIPERUS VIRGINIANA, REDCEDAR

Gymnosporangium juniperi-virginianae, rust, was common but accounted for only a trace of damage.

Phomopsis sp., blight, appeared to be an increasingly important disease and was observed affecting many nursery plantings. An estimated 5% of this nursery stock was considered to be affected to the extent that even after pruning, the trees would have no sale value.

ROSA spp., ROSE. Agrobacterium tumefaciens, crowngall, was estimated to be responsible for a loss of 1%. Diplocarpon rosae, black spot, was general, the severity varying with protective measures applied. It was estimated to have caused a 5% loss. Sphaerotheca humuli and S. pannosa were prevalent and estimated to have caused 5% damage.

ULMUS AMERICANA, AMERICAN ELM. Gnomonia ulmea, leaf spot, was generally distributed and caused moderate damage through defoliation.

ULMUS PARVIFOLIA, LEATHERLEAF ELM. Gnomonia ulmea, leaf spot, was severe and responsible for much defoliation by midsummer.